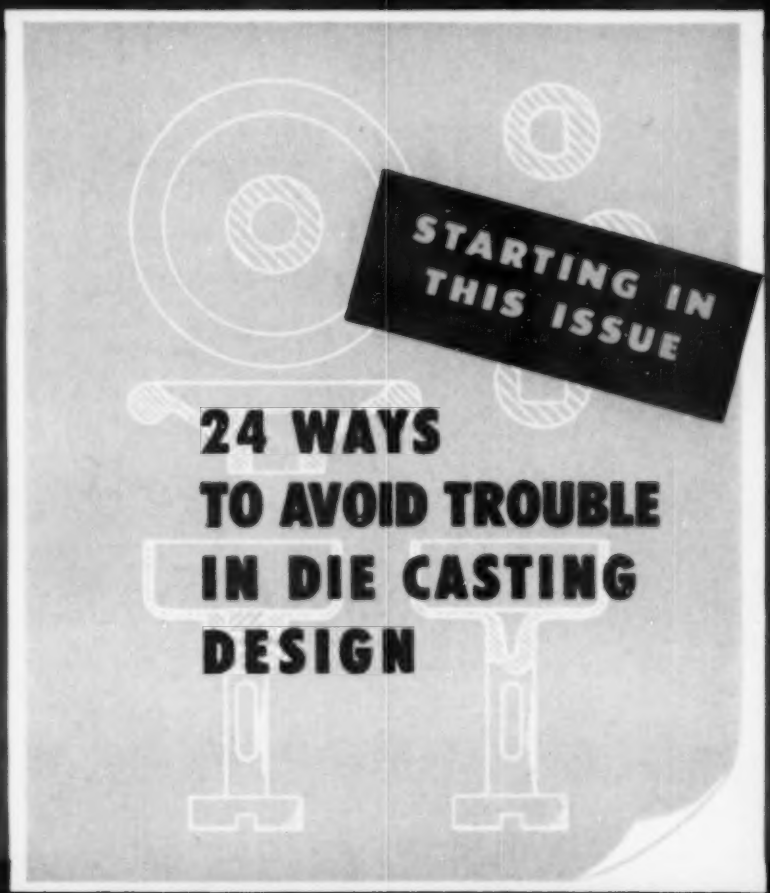
DIE CASTINGS

INCLUDING A SPECIAL FINISHING SECTION



September 1950

THE PRODUCT DESIGN MAGAZINE FOR USERS AND POTENTIAL USERS OF DIE CASTINGS

if you're bothered by a tough casting problem >>>

YOUR ANSWER IS...

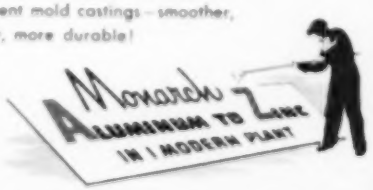
VELVAGLAZE®

two new folders give you the complete VELVAGLAZE story

Send today for your free copy of "Here's how you can cut die castings finishing costs." The biggest die castings news in years! An actual case history of how the VELVAGLAZE process cut one user's finishing costs in half and added to the appearance and sales appeal of his product!

Send today for your free copy of "Good News for design and product engineers." Get all the facts on how the VELVAGLAZE process can make your aluminum permanent mold castings—smoother, brighter, more durable!

VELVAGLAZE makes sales!



MONARCH ALUMINUM MFG. COMPANY • Detroit Avenue at West 93rd Street, Cleveland 2, Ohio

THERE'S A REASON WHY

Since 1930 so many

Customers who discriminate

Have always selected

As being their most

Logical and reliable source

To supply quality

Zinc alloy die castings

A TRIAL WILL CONVINCE YOU, TOO,
OF THE DIFFERENCE

SCHULTZ DIE CASTING COMPANY
1810 CLINTON STREET • TOLEDO 7, OHIO

SEPTEMBER 1950
Vol. 8 No. 9

DIE CASTINGS

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Los Angeles 17, California
Tucker 6703

COVER—Shown are two of the diagrammatic drawings which accompany "24 Ways to Avoid Trouble in Die Casting Design," an article by DIE CASTINGS European Editor, Hiram K. Barton. First of three parts, the article will run through October and November.

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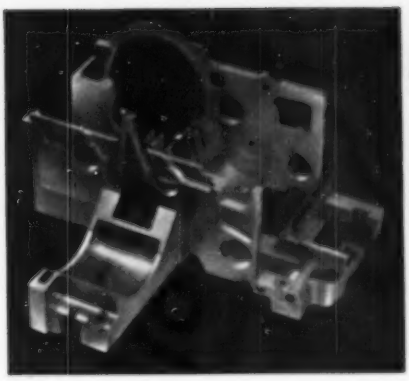
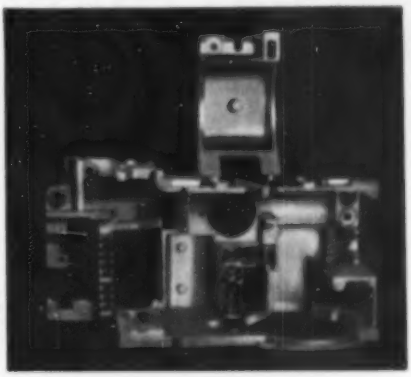
MAGNESIUM DIE CASTINGS

"They're priced competitively"

Magnesium die castings can improve your product! And you don't have to pay a premium to get the advantages offered by magnesium. In most cases *Dow magnesium die castings are competitive with those in other metals* and in some cases they are cheaper. Use this established die casting material for your product. A wide range of applications in many different fields has proved magnesium die castings sound and economical.



hold slots to ±0.001" with no taper?



Dow can do it in Magnesium!

Design requirements for this teletype bracket frame were tough. To eliminate some costly machining operations, it was desired to cast the numerous slots without taper and to hold tolerances in the slots to ±0.001". In addition, all holes in the casting were to be produced by coring. As cast in magnesium, the brackets met these stiff requirements.

Magnesium alloys don't solder to the die. This makes it possible to cast small cored holes and slots without taper. Dimensional accuracy can be maintained at a high level because magnesium alloys don't "creep" or "grow". Magnesium's unequalled machinability makes any required machining fast and economical. And a high strength-weight ratio allows strong, rigid design at minimum weight.

If you have a die casting application, write to Dow. Find out how Dow magnesium die castings can improve your product, cut its cost, make it easier to sell. Use Dow's production facilities for quality die castings at competitive prices.

Write to Dept. MG17

Magnesium Division

THE DOW CHEMICAL COMPANY

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New York • Boston • Philadelphia • Washington • Atlanta
Cleveland • Detroit • Chicago • St. Louis • Houston
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THE *Magic Touch*

... that Increases Sales with MADISON-KIPP *Zinc and Aluminum* DIE CASTINGS

RED DEVIL NO. 30 PAINT CONDITIONER WITH SPRING MOUNTED COUNTER BASE. MANUFACTURED BY RED DEVIL TOOLS, IRVINGTON 11, NEW JERSEY, U. S. A.

THE legions of amateur painters have learned from experience to buy paint at stores equipped with mechanical mixers.

The paint store managers have learned from experience to buy Red Devil Paint Conditioners to do the essential job of paint mixing for their customers.

The Red Devil engineers know the great value of adding eye appeal, strength, lightness and quality to their products with Madison-Kipp zinc and aluminum die castings.

If you use metal parts in production quantities, you may find it profitable to send data on to us at our home office in Madison.

MADISON-KIPP CORPORATION

213 WAUBESA STREET, MADISON 10, WIS., U.S.A.

ANCIENS ATELIERS GASQUY, 31 Rue du Marais, Brussels, Belgium, sole agents for Belgium, Holland, France, and Switzerland.

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- *Skilled in* DIE CASTING *Mechanics*
- *Experienced in* LUBRICATION *Engineering*
- *Originators of Really High Speed* AIR TOOLS

The RING Automatic SHOT CONTROL UNIT

Increases the Efficiency of your ZINC or ALUMINUM DIE CASTING MACHINES

REGULATES YOUR SHOT FROM 1" TO FULL STROKE AT VARIABLE SPEEDS

This remarkable control unit permits metal to flow into die cavity at reduced pressure until about 2/3 full, at which time full line pressure is applied. Air is allowed to escape during the initial period of flow so that when full pressure is applied a superior casting results . . . BETTER STRUCTURE, BETTER FINISH, FEWER REJECTS.

The unit is easy to install, simple to adjust, positive in action. It has only one moving part, is trouble free in operation and is built to out-last the machine upon which installed.

CONTAINS ONLY ONE MOVING PART!

- REDUCES REJECTS
- SAVES TIME
- INCREASES OUTPUT
- CUTS FINISHING COST
- IS EASILY INSTALLED IN THE HYDRAULIC LINE
- AMORTIZES ITS COSTS QUICKLY

Installed quickly in the hydraulic line between operating valve and shot cylinder. This unit is easy to adjust to specific dies and produces immediate results in the form of better castings and more of them.

Engineers and executives concerned with die casting operations find that fewer rejects, better castings and lower finishing costs result when this unit is installed. Four page circular and data will be sent at once on request.

RING VALVE COMPANY
Clawson, Michigan

Gentlemen:

Please send circular and data on Ring Automatic Shot Control Unit at once.

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

RING VALVE CO., Inc.
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Telephone LIncoln 2-3387

Right in the center of the industrial Northeast is the Newton-New Haven Company. Here is an organization with a record of more than thirty years of production "Know-How" in Die Castings.

There is a Newton-New Haven Sales Engineer right in your area. Write, Wire or Call—New Haven WEst 3-1677—and he will be at your desk promptly to discuss your Die Casting problems.

Newton-New Haven has prepared a booklet on "Dimensioning Die Castings." This is basic data that every Engineer and Designer should have. Write on your company letterhead for your copy.

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689 THIRD AVENUE
WEST HAVEN 16, CONNECTICUT

LETTERS to the Editor

BARREL CHROME PLATING

I would appreciate it if you would forward a tear sheet of the article entitled "Barrel Chrome Plating Small Die Cast Parts Cuts Finishing Costs," which appeared in the March, 1950, issue of your magazine.—B. C.

Tear sheets forwarded.—Ed.

DIE CASTING ZINC ON WOOD FOR ROLLER SKATE WHEELS

I have just finished reading the article "Die Casting Zinc on Wood" which appears starting on page 25 of your July issue. The process for making the Brownie Precision Wheel for roller skates seems to be a very ingenious one. I am, therefore, interested in getting in touch with one or both of the following: B. M. S. Skate Company and the company that perfected the die casting process. I have been unable to contact the B. M. S. Skate Company since there is no record of such a concern in Newark, New Jersey.—E. S. C.

Address of the B. M. S. Skate Company is 985 Frelinghuysen Ave., Newark 5, N. J.—Ed.

CROWN FACED PULLEY SOURCE

We have received your magazine DIE CASTINGS for several years and find it extremely informative concerning the die casting industry.

For a number of years we have been purchasing Die Cast Crown Faced Pulleys. However, the firm from which we have bought them advises us that their molds are now worn out and they do not desire to replace.

You no doubt know of several firms that are in a position to furnish standard crown faced

(Continued on Page 12)

A man from PRECISION is always welcome—

He BRINGS IDEAS!

Ideas for better products—for lower cost products through Precision Die Castings. For more than 41 years, Precision has pioneered in new developments in the die casting industry. Precision has led the way in helping industry find better ways to produce its products with fine die castings. Precision can help you too!

Better DIE CASTING IN ALUMINUM MAGNESIUM AND ZINC

Call a PRECISION Engineer, Today!

*Since 1909 the name "PRECISION" has been the symbol of highest quality in the die casting industry

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DEPENDABLE
BETTER METHODS
SUPER CAST
DIE CASTINGS
BETTER DIE CASTINGS
SINCE 1919

The meaning of a signature!

Through a quarter of a century of knowing how, the SUPER CAST reputation for Better Methods—Better Die Castings, has been recognized.

Sound engineering, metallurgical knowledge and skilled techniques have achieved and maintained a standard of superior quality.

SUPER CAST has kept faith, always deserving the mark it bears. SUPER CAST means die castings for those who want the best.

A sound, time-tested institution and a sound time-tested product have won confidence and widespread endorsement.

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BETTER DIE CASTINGS
SINCE 1919

THE SUPERIOR DIE CASTING COMPANY

1001 London Road CLEVELAND 10, OHIO

Detroit Chicago Pittsburgh

LITERATURE AND SERVICES OFFERED IN THIS MONTH'S ADS

NOTE: Circle numbers on the enclosed postcard to indicate literature, samples or trial services you wish to receive.

A-1 RING VALVE CO., INC. An automatic shot control unit that minimizes porosity in die castings and produces a sound, hardware finished surface that can be plated without buffing is described in literature from the company.

A-2 DOW CHEMICAL CO. How quality magnesium die castings can be obtained at competitive prices by using Dow production facilities is explained in literature offered by the company.

A-3 ACROMARK COMPANY. Literature is presented on hand and motor driven models of the Acroprinter, a machine for filling recessed letters and designs on die cast parts with enamel.

A-4 DETROIT POWER SCREWDRIVER CO. The company offers two catalogs on how to save time in assembly work. The first contains illustrations and descriptions of a new power nut driver that eliminates manual handling of nuts, while the second covers the company's line of magazine-fed, power-driven screwdrivers.

A-5 DIVERSEY CORP. A Cleaner, No. 505, that conditions the surface of zinc die castings prior to plating while removing unwanted deposits is described in literature available.

A-6 FEDERATED METALS DIVISION, AMERICAN SMELTING AND REFINING CO. "Di-Metal for Better Die Castings," a 24-page booklet that discusses die casting metallurgy and list specifications Di-Metal zinc alloys is available.

A-7 DULITE CHEMICAL CORP. An all purpose cleaner, No. 37, that cleans all metals except aluminum, and a cleaner, No. 31, that cleans steel and all ferrous metals, prior to plating is described by literature offered by the company.

A-8 LITEMETAL DICAST, INC. Literature and design information on aluminum and magnesium die castings are available.

A-9 HYPREZ DIVISION, ENGIS EQUIPMENT CO. Samples of the company's laminated lapping stick for use on die casting dies is offered by the company.

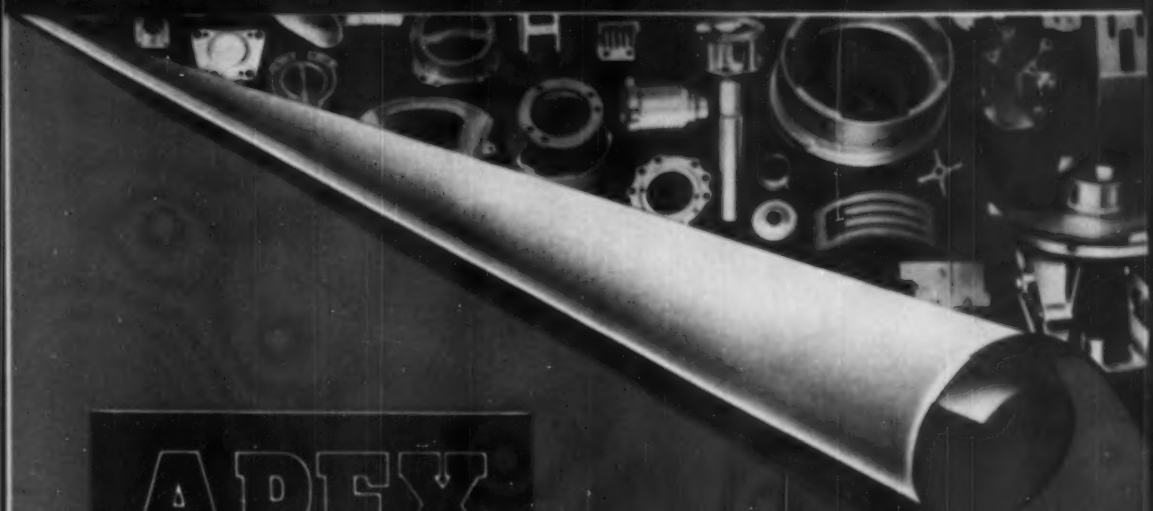
A-10 PARKER WHITE METAL CO. How the company assures its customers of die castings that meet specifications is explained in all illustrated booklet discussing Parker's 16 Point Production Control Program. The booklet tells what can be done for individual users of die castings by Parker facilities.

A-11 G. W. SMITH AND SONS, INC. Samples of Die Slick, an easy-to-use die lubricant that prevents sticking on even complicated dies, are offered by the company.

A-12 STROMAN FURNACE AND ENGINEERING CO. Full information is available on the company's Model "DS" reverberatory furnace for melting and holding aluminum.

A-13 MEAD SPECIALTIES CO. A simple, inexpensive device that converts a standard drill press into a semi-automatic machine is described in a catalog available.

(Continued on Page 12)



APEX

ALUMINUM • MAGNESIUM • ZINC BASE

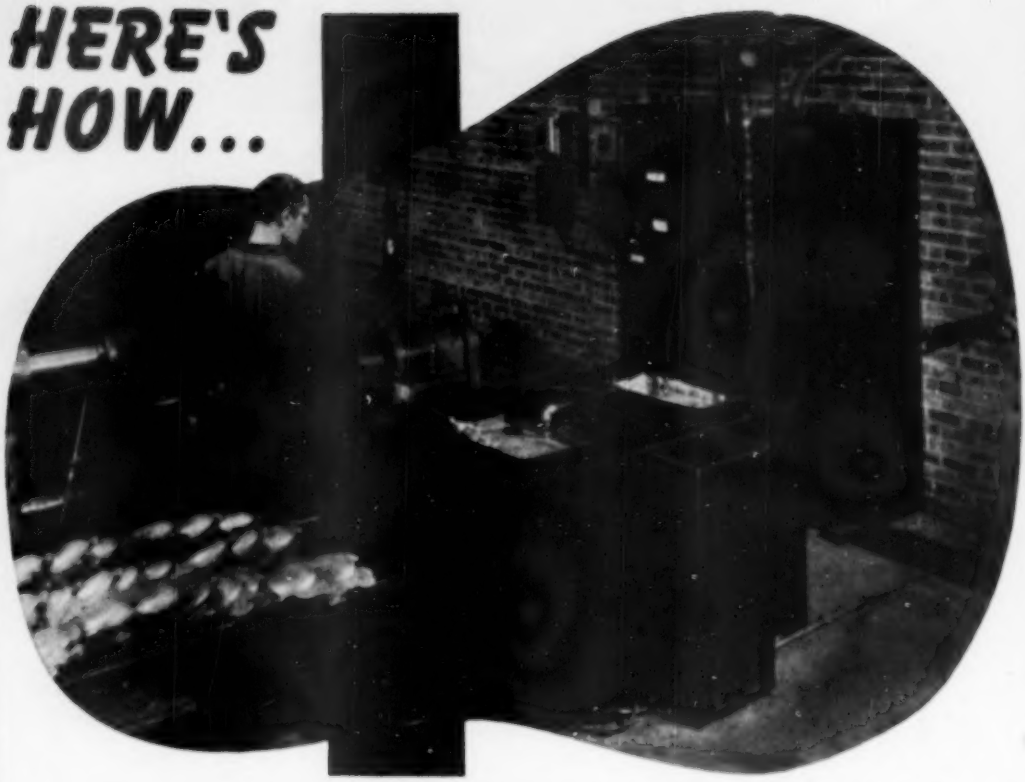
DIE CASTING ALLOYS

Dependable high quality die cast alloy ingot—an important factor in production for dependable die castings—made to exacting specifications—complete Spectrograph and Quantometer control from raw material to the finished alloy—assuring uniform composition—less production problems—more customer satisfaction

Buy the Best—Buy APEX.

APEX SMELTING COMPANY

HERE'S HOW...



Roe F. Reed, President, Reed Metal Crafts and prominent in die casting circles says: "We're more than satisfied with our Lindberg-Fisher melting furnace. We've ordered another, and plan to install more in the future".

Ask for reprint of magazine article "Two-Chamber Induction Melting Furnace Lowers Aluminum Die Casting Cost".

★ **Casting rejects are reduced 43% . . .**
★ **Production increased 22% . . .**
★ **Per Unit Labor Cost cut 24% . . .**
at Reed Metal Crafts, Chicago

A Lindberg-Fisher 2-chamber induction melting furnace was recently installed by this well known Chicago custom die casting plant. They report reduced rejects and increased production because . . .

. . . **there is no alloy segregation** and thus no rejects due to machining difficulty resulting from segregate-inclusions. Alloys are *kept* in solution and effectiveness of alloy content is *not* lost.

. . . **molten aluminum temperature uniformity is held to plus or minus 5 F.** Castings can be shot at lower temperatures because there is no need to allow for furnace over-and undershooting. Lower casting temperature permits more shots per hour—increases production—reduces rejects.

. . . **ladling is continuous.** Ingot or scrap is charged into *separate* chamber—melts and flows into ladling chamber. No lost stand-by time while aluminum melts.

. . . **only metal is heated,** not the entire furnace. Reduced heat radiation from furnace shell lowers temperature 20°–25° F. at operator's station—improves working conditions.

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.
2463 West Hubbard Street, Chicago 12, Illinois

DIE CASTING
—a story of bigger profits in scores of lines

CASE HISTORIES FROM MT. VERNON FILES

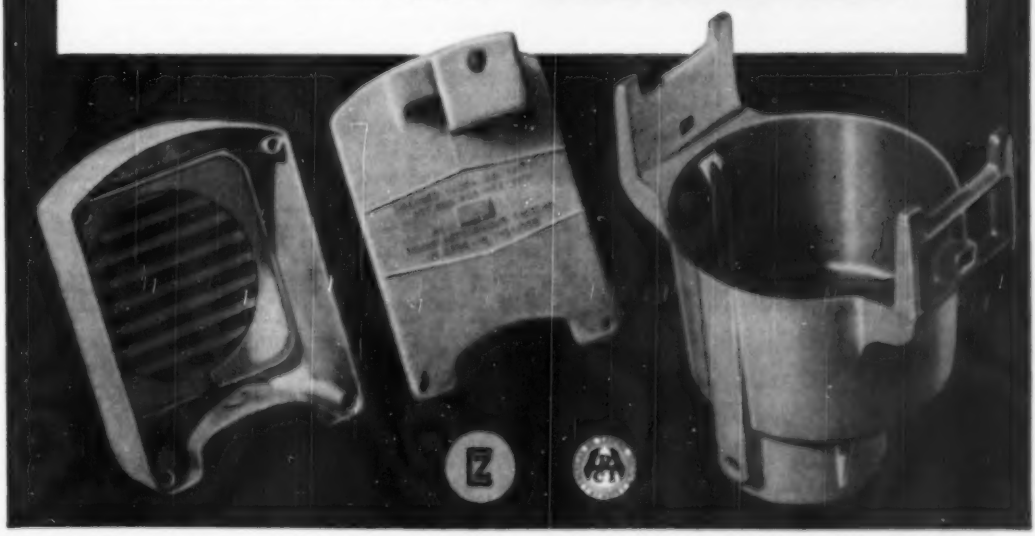
Yes, here at Mount Vernon, we have shown numerous manufacturers the way to increased output at lower unit costs.

By way of illustration, let us take this speaker assembly for drive-in movie theaters: Two speakers are hung on a "coupling unit" which fits over a post and is secured by a set screw. The coupling unit accommodates a transformer, a dome light, and lighting directed downward to illuminate the post at night, and it provides hangers on which the speakers are hooked when not in use. A car window hook-on device is an integral part of each speaker housing.

The entire assembly, with its different shapes and all details—apertures, channels, screw posts, ribs and other structural features—is produced rapidly, accurately and with outstanding economy by die casting.

All items are produced so clean that need for subsequent machining is practically eliminated; and an attractive, high-gloss, baked-on finish can easily be applied.

Whatever your "line" as a manufacturer, if you are not already using die casting, it is very probable you will find it highly advantageous to do so. Why not send us your specifications . . . let our specialized knowledge and up-to-the-minute facilities show you the way to increased production and an improved profit picture?



. . . *it takes*

Organized, Systematic Inspection and Testing!

In die casting, as in all manufacturing, the possibility of human error is always present. To safeguard against it requires a carefully organized "Inspection Routine". At Milwaukee, this begins at the die casting machines.

Here machine operators and supervisors assume full responsibility for the proper functioning of the machines, the precise action of the dies, the condition of the alloy. Their work is double-checked by a staff of trained inspectors who check the castings turned out at each machine. This inspection eliminates many scrap castings, as well as wasted labor in subsequent operations.

The number of inspections which a casting receives depends upon its characteristics and ultimate use. The purpose of one inspection may be to check all dimensions; another to check the location of cast-in holes, threads, or inserts. Flaws in the metal must be located. Some castings are tested for tensile strength; others for the ability to withstand air or hydraulic pressure.

Such an inspection program requires a complete assortment of precision gauges and instruments, the design and fabrication of many special gauges . . . plus a carefully trained inspection staff . . . to the end that specifications are strictly adhered to.

MILWAUKEE DIE CASTING COMPANY

1019 N. FOURTH STREET • MILWAUKEE 3, WISCONSIN

LITERATURE AND SERVICES

(Continued from Page 8)

A-14 OAKITE PRODUCTS, INC. "Some good things to know about Metal cleaning" is the title of a 44-page booklet offered by Oakite.

A-15 ROTO-FINISH CO. Information on the use of Roto-Finish barrel tumbling processes to finish die cast parts is available. Sample processing and a processing report can also be had.

A-16 MAAS & WALDSTEIN CO. An air-drying lacquer enamel that can be applied to zinc and aluminum die castings without pretreatment is described in Technical Bulletin No. 113 from the company. A color card of available colors can also be had.

A-17 MONARCH ALUMINUM MFG. CO. The company's new Velvaglaze process that helps solve casting problems is described in two booklets offered by the company. The first is "Here's how you can cut die casting finishing costs" while the second is "Good news for design and product engineers."

A-18 FISHER FURNACE DIVISION, LINDBERG ENGINEERING CO. "Two-chamber induction melting furnace lowers aluminum die casting cost" is a reprint of a magazine article available from the company.

A-19 ALMCO DIVISION, QUEEN STOVE WORKS, INC. Almco Supershoon barrel tumbling equipment is described in a folder now available. Also offered is information on Supershoon Engineering Clinics, a nation-wide network of engineering clinics that offer sample processing.

A-20 NEWTON-NEW HAVEN CO. "How to Dimension Prints for Die Castings" is the title of a booklet offered by the company. The booklet contains step-by-step illustrated details on the proper dimensioning of die casting blue prints.

A-21 GRIES REPRODUCER CO. Besides offering bulletins on its production facilities in the field of small zinc alloy die castings, Gries Reproducer offers samples of its work. The company specializes in the production of tiny die castings.

A-22 MITCHELL-BRADFORD CHEMICAL CO. The story of Black Magic finishes for zinc die castings and other metal finishes made by the company is found in literature offered by the company.

A-23 UNITED CHROMIUM, INC. Literature is offered on how to give zinc die castings corrosion resistance, sparkling finish and good paint adherance by using the company's Unichrome Dip.

A-24 WAGNER BROS., INC. How the company makes new nickel anodes from nickel scrap is explained. Full directions for packing and shipping and quotations are available.

LETTERS TO THE EDITOR

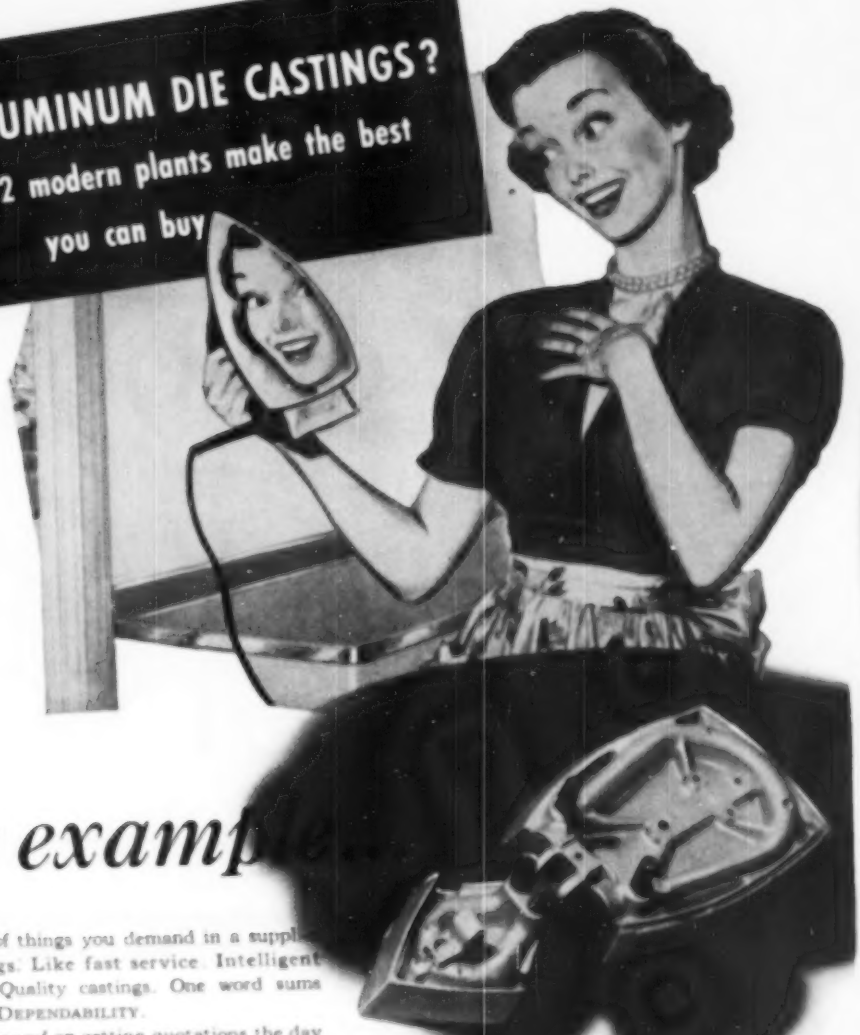
(Continued from Page 6)

pulleys made of die cast material and we would appreciate receiving a list of these, if convenient. —H. T. H.

We turn this inquiry over to our readers.—Ed.

NEED ALUMINUM DIE CASTINGS?

Alcoa's 2 modern plants make the best you can buy



for examp...

There's a lot of things you demand in a suppl... of die castings. Like fast service. Intelligent design help. Quality castings. One word sums them up . . . DEPENDABILITY.

You can *depend* on getting quotations the day we promise them. You can *depend* on Alcoa's design help based on 62 years of aluminum experience. You can *depend* on the quality of Alcoa castings and the firmness of Alcoa deliveries. Alcoa's built that kind of reputation during 35 years in the die casting business.

Whether ... flat ... ...oits, there's an Alcoa specialist near you . . . ready to serve you. Look under "Aluminum" in your classified phone book. Or write ALUMINUM COMPANY OF AMERICA, 1895J Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA

ALCOA DIE CASTINGS

INGOT • SHEET & PLATE • SHAPES, ROLLED & EXTRUDED • WIRE • ROD • BAR • TUBING • PIPE • SAND, DIE & PERMANENT MOLD CASTINGS • FORGINGS • IMPACT EXTRUSIONS
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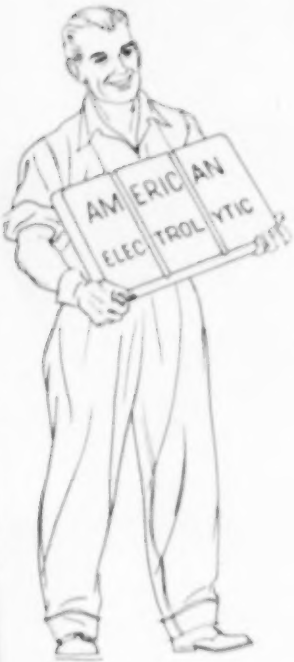
FOR QUALITY PRODUCTION

AMERICAN ELECTROLYTIC

99.99+% SLAB ZINC



A RELIABLE SOURCE FOR DIE CASTING REQUIREMENTS

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for AMERICAN ZINC, LEAD & SMELTING CO.
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Chicago
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Die Casting Die Designing is an art requiring an extensive knowledge of metals, metal-working techniques, engineering skill, and wide experience. Our designers are craftsmen with many years' direct contact experience in application and end use requirements.

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- Designing
- Die Making
- Engineering
- Metallurgical Control
- Most modern Die Casting Equipment
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We invite inquiries concerning all Die Casting problems.

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Division of Stewart-Warner Corporation

4535 Fullerton Avenue, Chicago 39, Illinois
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We take pride in being known by the customers we keep

a CHEAPER BETTER ALUMINUM DIE CASTING ALLOY

FEDERATED METALS' F-4110 (F-four-eleven-oh) is an aluminum die casting alloy that has proved superior *in service* to the standard 12% silicon-aluminum alloy. F-4110 is:

More machinable
Harder
Equally fluid
Higher in tensile strength
Higher in yield strength
Higher in proportional limit
Less prone to weld to the die
Whiter finish after polishing
LOWER IN PRICE!

This versatile alloy was developed in Federated's research laboratories . . . proved superior by leading die casters. For lower costs and a better product . . . try Federated F-4110!

To order, or to obtain more information, call or write one of Federated's 25 nationwide sales offices.

Federated Metals Division

AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N. Y.

PRESSURE CASTINGS, INC.

die castings

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Ralph E. Zimmerman
Detroit, Michigan

E. R. Dailey Company
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MEMBER AMERICAN DIE CASTING INSTITUTE

NEW...NEW...NEW!

STROMAN MODEL "DS" REVERBERATORY FURNACE FOR MELTING ALUMINUM

Front view, dipping end

The Stroman Model "DS" Furnace is a combination melting and holding furnace, a complete unit in itself. Charge in one end, dip out of the other, and there are no iron pots or crucibles to buy! It has a capacity of 200 to 300 lbs. hourly, and eliminates the necessity of having breakdown and holding furnaces.

This direct fired furnace is the most economical available for the melting of aluminum, saving over 50% in fuel costs over any other type. There is no transfer of metal from breakdown to holding furnace as this is automatic in this combination unit.

Another outstanding feature is the fact that ingots and returns are melted where they are cast. There is no handling of hot metal except to the die or mold.

In the "DS" Furnace metal is melted in a reducing atmosphere . . . is free from porosity with little or no dross.

The "DS" Furnace provides a complete melting unit for each Die Casting or Permanent Mold machine. It is a portable unit and may be moved to any desired position in the plant. The modern, streamlined design conserves space, and installation is the simple matter of bringing gas and electric line to the furnace.

The "DS" Furnace is equipped with a hydraulic jack for tilting, so that the operator can empty the furnace of metal when day is done. It is also a convenience in changing alloys as the operator can clean the furnace.

Investigate these entirely new, economical and easiest to operate furnaces today. They will save money for you in your plant . . . and their cost is so surprisingly low that the savings they effect will pay for their installation in no time at all.
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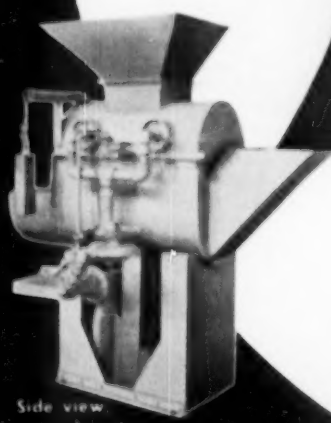
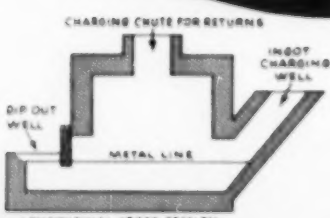
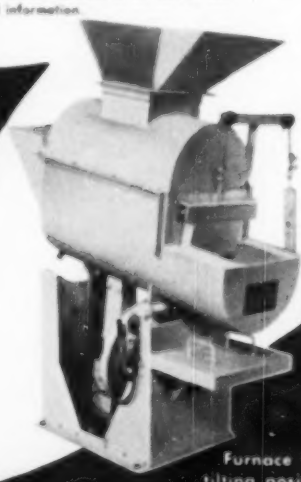


Side view showing burner



LONGITUDINAL CROSS SECTION THRU DIP-OUT WELL



Furnace in tilting position

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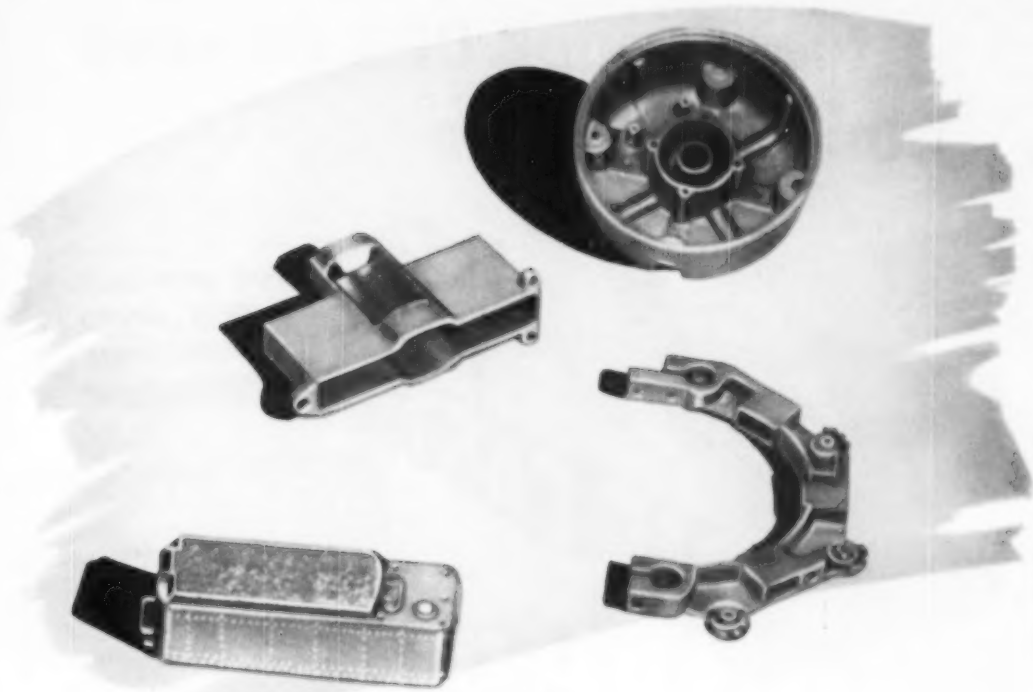

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ZINC ALLOY DIE CASTINGS

Percent of 1949 Sales by End Uses
(Based on Estimates of AMERICAN DIE CASTING INSTITUTE covering Jobbing Die Casters only)

INDUSTRY & PRODUCT	% POUNDS SHIPPED
Transportation - Motor Vehicles	54.4
Household Appliances, Furnishings, Equipment	22.4
Mining, Construction, Agricultural Machinery, Commercial Machines & Equipment	8.4
Plumbing, Heating & Builders Hardware	5.4
Office Machines, Photographic, Optical & Scientific Instruments & Equipment	3.7
Communication Equipment, Electronic & Timing Devices, Clocks, Vending Machines, etc.	3.3
Sporting Goods, Jewelry, Toys, etc.	2.4

Other industries have found similar advantages in the adoption of zinc die casting for their respective products. This is evidenced by the fact that nearly 75% of all die castings by weight are based on zinc.

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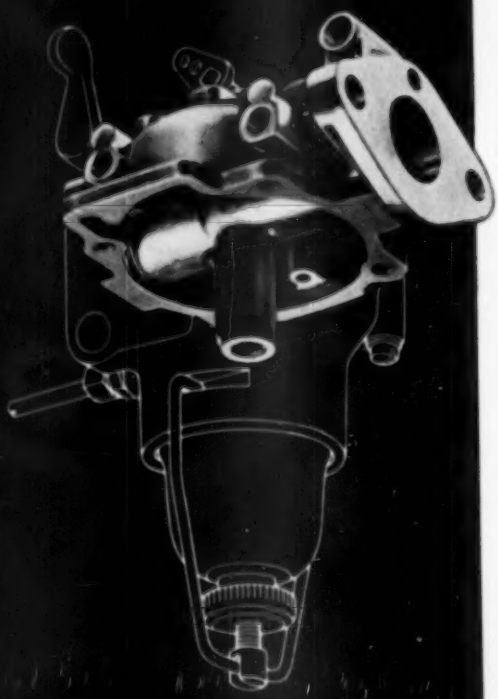
Die cast by Hoover

TO BREAK PRODUCTION BOTTLENECK



This complex die casting, produced by Hoover for the makers of Tillotson carburetors, is notable for its intricate coring and its many close tolerances. It contains holes on all six sides, which must be perfectly aligned, and must be absolutely free from porosity to prevent leakage.

The aluminum die casting illustrated is a vital part of the Tillotson carburetors used on many well-known makes of outboard motors. Because of the high percentage of rejections, getting this part in sufficient quantity was formerly a major production problem for Tillotson.

Then The Hoover Company was called in to work closely with Tillotson engineers in designing a new two-cavity die to replace the one-cavity type previously used. This new method proved successful in producing the quantity needed, and of a quality remarkable for so complex a casting—(rejections in the first year amounting to less than 1%!).

Successful solutions to die-casting problems are nothing new to The Hoover Company, with its 28 years of experience and its complete engineering, design and production service. And Hoover know-how is at *your* service if you have a problem, or if you would like to investigate the use of die castings (zinc or aluminum) to reduce costs and improve the sales appeal of your product.

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THE HOOVER COMPANY
Die Castings Division, North Canton, Ohio

Hoover

Specialists in the field of Die Castings

20 YEARS OLD

THE fact that our company is 20 years old this month is relatively unimportant to anyone except ourselves. Thousands upon thousands of other companies have become 20 years old, and much older. But, to us, the important thing is the way in which this company started, and the way it has progressed these 20 years. Because only in America could this story have been written.

This company started on the ashes of a depression failure. Our first magazine, Industry and Welding, had 24 pages in each issue, of which 3, 4, 5, or 6 were advertising. At 3, 4, or 5 pages, we couldn't pay our printer, but with 6 we could just make it. Whether there were 3, 4, 5, or 6 pages of advertising at no time removed the personal necessity of eating, dressing, and traveling to get the 7th, 8th, and 9th page of advertising. Somehow, we muddled through. In America, you can do those things—with pride.

Many was the time when it looked as though we couldn't make it—and always, when it looked blackest, some miracle would happen and we'd be in business—for another month at least. We stuck. Friends were good to us. People had faith in what we were doing. You find that Americans like to help other Americans who are trying to help themselves. It is the essence of our country, of free enterprise.

No government questioned our right to be in business. No bureau told us what to print or how it should be said. We were free to make whatever profit we could manage and reinvest it in our own business or in any other way we saw fit. That, too, is the American way.

We chose to start magazines in other fields. No one told us what fields to start in or whether we could go into them. As long as we were willing to work and take the beating that every new, small business must take, we were permitted to build our business in our own way.

These 20 years have been gratifying ones. It has been fun building a business. There's been a lot of hard work, long hours, and various worries, but we're glad we're in the publishing business, because we feel that we have contributed something to industry and to the general welfare of our country. We shall continue to do so. But again we say, ONLY IN AMERICA COULD THIS STORY HAVE BEEN WRITTEN. It is one of our great heritages which, unfortunately, we take for granted, but it's one worth keeping and worth fighting for.

Irving Bluestein

24 ways to avoid trouble in Die Casting Design

(PART ONE)

By HIRAM K. BARTON

VERSATILITY of the die casting process is its greatest asset, yet by a strange paradox this same versatility often results in the process being utilized with less than 100 per cent effectivity. Die castings are uncomplaining pinch-hitters; ready to stand in for any other type of product without major design alteration. Too often, accordingly, conversion of existing parts to die castings is carried out merely by annotating the part drawing—"To be cast in . . . . alloy."

As almost any functional feature producible by standard manufacturing methods can be reproduced by die casting, even this casual approach often pays dividends. Seldom, however, does it exploit to the full the potentialities of the die casting process: to get the most out of die castings the designer must be prepared to get right back to fundamentals, to consider his product solely in the light of its functions and without the arbitrary form that was probably imposed upon it by the requirements of some other method of manufacture.

Further, he must consider whether parts which for ease of manufacture have previously been produced separately can be

FIGURE 1

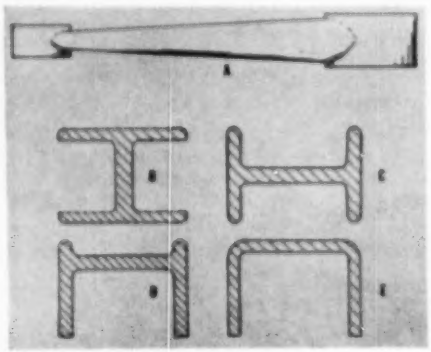


FIGURE 1. IN REDESIGNING SAND CASTINGS for die cast production it must be remembered that tooling charges are high and that the die, in consequence, must be as simple in form as possible. Ideally, all cored holes and lightening recesses should be so orientated that they can be formed in a two-part tool, for this not only reduces initial construction costs, but also permits a higher rate of production than when cross slides for withdrawable cores have to be provided. Thus the sand cast crank of Figure 1A, with its heavy elliptical section, may well be modified to give an H-section when die cast. If the form at B is adopted, however, cross-slides will be needed to form the recesses and unnecessary die charges will be incurred. The form at C is accordingly preferable, but if the deeply recessed top does not find favor on grounds of appearance, the alternatives shown below are available. That at E should be adopted if the component is to be plated, since it is the easiest to buff.

FIGURE 2

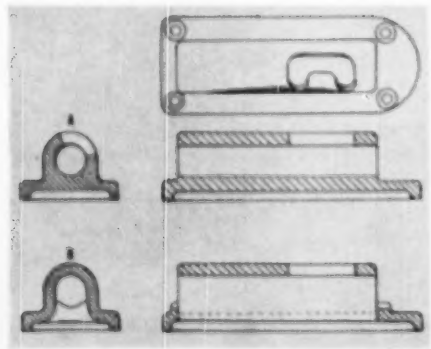
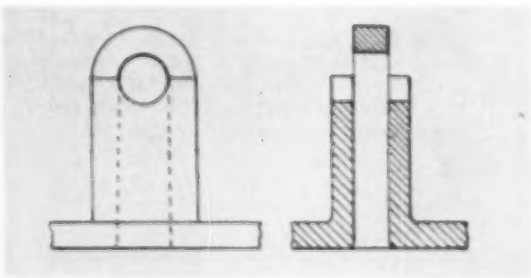


FIGURE 3



combined—as is often practicable—in a single unitary die casting.

It is by such radical reassessments that the most successful conversions have been and are being made, for it often happens that on a dollars-and-cents basis a die casting shows no economy over a part of identical design when both are brought in for further processing.

Frequently, and notably in the case where the comparison is with ferrous or non-ferrous foundry products, the cost of the die casting is considerably greater. The primary advantage of the die casting is that invariably it reduces processing costs; handling, machining and assembly operations can either be eliminated or carried out more speedily, while finishing costs—polishing, plating and organic finishes—are most times lower

FIGURE 2. CROSS-SLIDES CAN OFTEN BE AVOIDED by only minor changes in design; an example is the bolt body of Figure 2. Here it was at first envisaged that a moving core would be needed to form the long lateral hole as at A, but by leaving the underside of the hole open as in the lower sketch B it became possible to use a fixed core instead. This did not affect the functioning of the bolt, as the ends of the shank project from the body in both open and closed positions.

FIGURE 3. AN EXPEDIENT similar to that shown in Figure 2 was adopted in a long die casting bearing a number of brackets with bearings for a slender shaft; these also were formed by fixed cores as shown in Figure 3. It is notable in this instance that it would have been very difficult to locate and actuate separate moving cores to form the transverse bearing holes, for these were situated deep in the fixed die member.

FIGURE 4

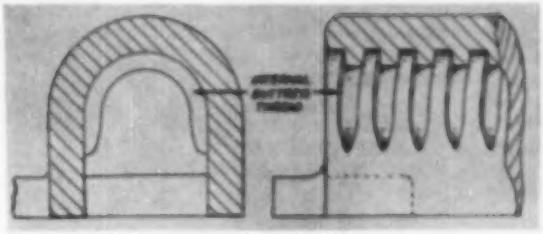


FIGURE 4. AN EVEN GREATER SAVING in cost was achieved by forming the bracket of a window-opening device as in Figure 3; this casting bears an internal buttress thread, Figure 4, which in the normal way would have to be formed by a rotating core. In this case a half-thread was cut on the end of the core. It had at first been proposed to fit a separate die cast insert bearing the other half of the thread, but a machined-up prototype was tested out and this was found to be unnecessary, for the half-thread withstood stresses at which the threaded rod failed. Note that by carrying the grooves partway down the sides of the core, the rod is actually supported for more than half of its diameter.

FIGURE 5

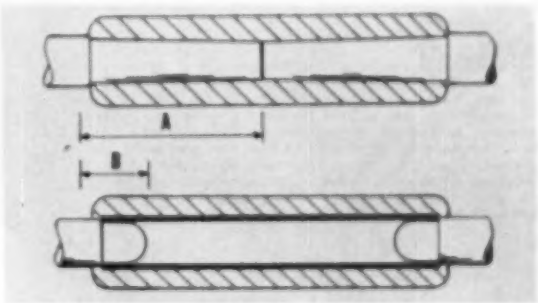


FIGURE 5. IN MANY INSTANCES the use of moving cores cannot be avoided, but it is often advisable to limit the length of the withdrawal by the use of tubular inserts. These are particularly valuable when long slender holes must pass through relatively thick sections of a component. If the hole is cored right through in such a position it is likely to be deflected by the pressure of the smushing metal. Moreover, the speed of production is reduced because the core, if slender, conducts heat only slowly and cannot be withdrawn until the whole mass of metal has solidified. Premature withdrawal results in distortion of the internal surface. By locating a tube of appropriate internal diameter between the two cores having only a short withdrawal stroke, Figure 5, both these sources of difficulty are eliminated. This method is also of value for the formation of holes that cannot be cored out or drilled, as for example dogleg holes or curved holes not following a circular arc. Large diameter tubular inserts, with the ends nosed down to a smaller size, have also been satisfactorily adopted for forming internal undercuts partway along a cored hole of smaller diameter.

than for comparable parts produced by other methods.

Essentially, this stems from the fact that many features of a product that are normally obtained by machining operations or by the assembly of a separate element can readily be incorporated in the die casting. Not only are direct labor costs reduced thereby; elimination of complete operations releases machines with high amortizations, cuts supervisory requirements and frees precious floor space, while fewer separate parts per assembly means smaller inventories.

What, then, are the key advantages that make it possible for a die casting, costing at gate perhaps three or four times as much as the stock parts that it replaces, to show an end-of-line saving of maybe 50 per cent

(Continued on Page 58)

FIGURE 6

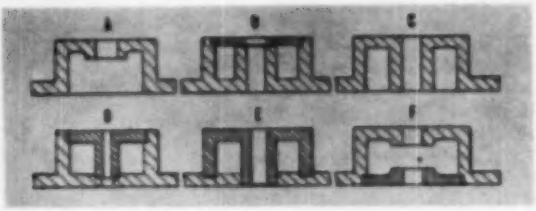


FIGURE 6. VERY HEAVY RISER FED SECTIONS that sometimes occur in sand castings should never be retained when converting the product. In die castings thin sections are proportionately much stronger than thick ones, and thin sections well ribbed are often absolutely stronger than equivalent solid sections, owing to the well distributed chilling effect of the die and the freedom from porosity. For this reason die castings are normally designed to be of substantially even section, the die carrying lightening pieces or "metal-savers" which core out thick section that would otherwise be formed between and around cored holes and in similar positions. Examples are shown in Figure 6, and it will be seen that there are a number of ways in which an even section may be achieved. The choice of a method depends largely upon the manner in which mating parts are to be assembled and, in a lesser degree, upon whether the metal-saving recesses can be formed on accessible surfaces or must be masked for the sake of product appearance.

FIGURE 7

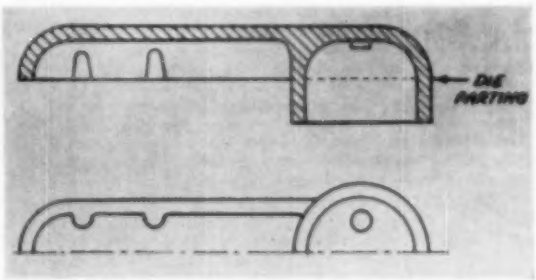


FIGURE 7. IN GENERAL, designs that allow positioning of all the cavity being formed in one half of the die, with all the cores and metal-savers mounted in the other, are preferable to designs in which the cavity is symmetrically split between the two die halves. An exception is when by sinking parts of the cavity in both die members a stepped parting line can be avoided. (Figure 7.) Apart from such cases, where functional needs of the product are paramount, cheaper die construction and cleaner finishing result when the parting line coincides with a face of the casting.

FIGURE 8

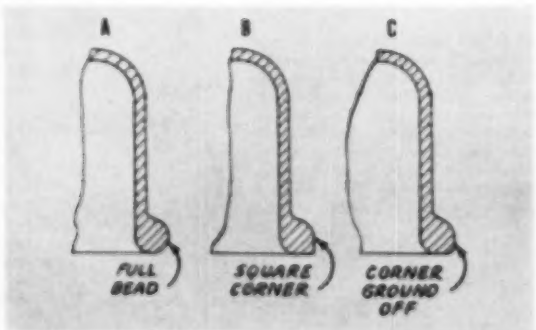
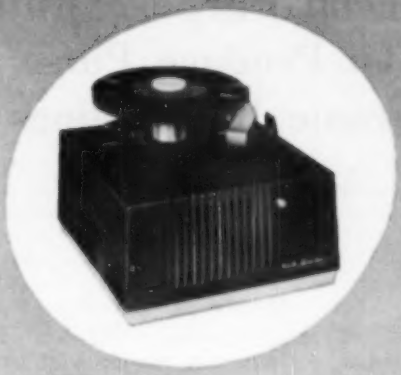
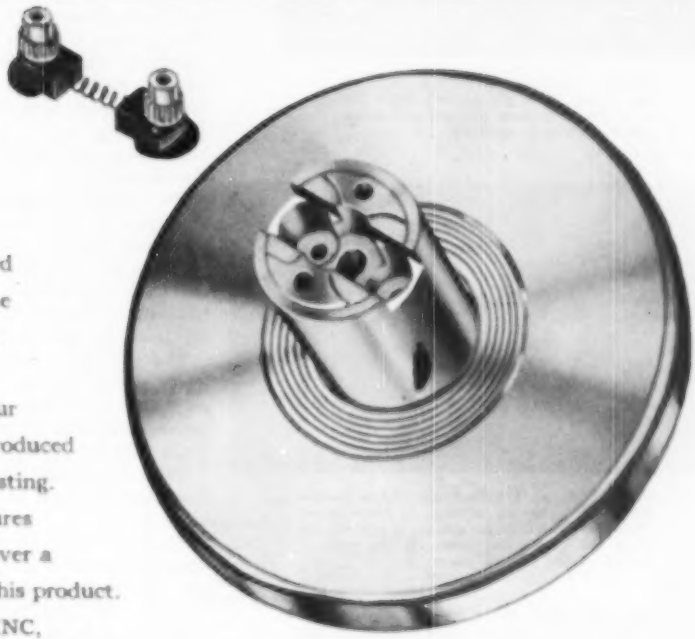


FIGURE 8. ONE DESIGN FEATURE that often adds considerably to tool costs, with little compensation in product appearance, is the provision of a full bead on the edge of a thin walled casting, Figure 8a. To form this the parting line must be taken through the largest diameter of the bead, so that the part below this must be formed in the core-bearing half of the tool. To match the two edges of the cavities precisely calls for exacting machining, and most times it is very much more satisfactory to adopt the construction of Figure 8b, and to radius the sharp edge on an emery belt after trimming.



Zinc-base die castings

have major role in RCA Victor's famous 45-rpm record changer



In RCA Victor's revolutionary 45-rpm record changer, Model 9-EY-3, the turntable, pinions, spindle, main cam, cycle lug and star wheel are die cast. Four of these components are produced as a single zinc-base die casting. Zinc of proper quality assures the dimensional stability over a prolonged period vital to this product. ANACONDA ELECTRIC* ZINC, 99.99+% pure, is *always* dependable. Anaconda Sales Company, 25 Broadway, New York 4, New York, Subsidiary of Anaconda Copper Mining Company.

The record-changing mechanism is housed inside the enlarged central post of the zinc base turntable die casting shown here. Zinc-base die cast pinions fit down inside the top of the central post. Photograph and data by courtesy of the Radio Corporation of America and the Doehler-Jarvis Corporation.

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Special-Purpose Units To Produce Purse Frame Die Castings

By E. I. VALYI
A. R. D. Corp

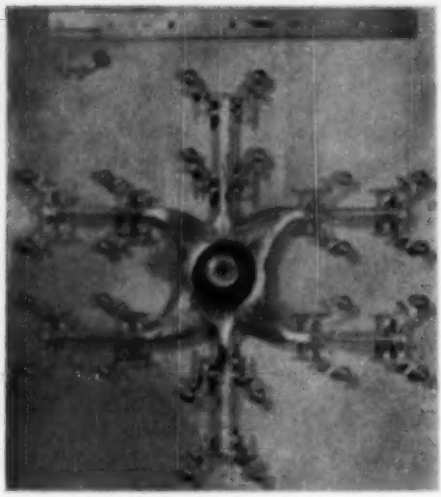
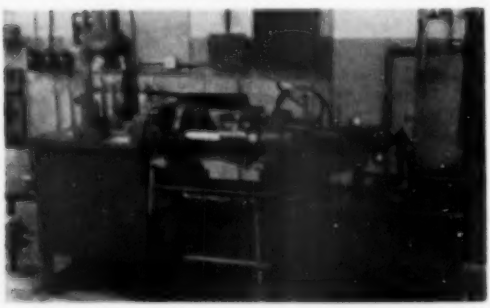


Figure 1. Twenty-four purse frame die castings of zinc, above, are cast in a single shot on a special purpose die casting machine with a speeded-up operating cycle.

Figure 2, above. The die layout used to produce the purse frame die castings is shown above. Note that the die proper consists of only the die plate and ejector pins, while the die frame is formed by the machine clamp.

Figure 3, below. The hydraulic system used to speed up the die casting cycle is shown partially on the die casting machine below. Shown are the cover die which is mounted on a floating platen and the intensifier and closing cylinder combination used for clamping.



ONE of the country's largest producers of purse frames required huge quantities of purse frame rivets and purse frame knobs. These components were previously made on headers and with progressive punch press dies respectively. For reasons of improved styling and production economy, zinc alloy die cast rivets and knobs began to replace wire and stamped products and have replaced them almost completely at this time. Die casting production of the parts posed a peculiar problem due to the extremely large quantities required.

To produce these specific parts with greatest economy, it was concluded that it would be best to design special purpose die casting machines.

Thus, die casting dies and trimming dies were designed to suit the parts and a machine designed to accommodate these dies, allowing for the shortest possible operating cycle.

The die layout resulted in twenty-four impressions which are so spaced that two impressions each are produced with one hob, the die itself being composed of replaceable inserts. A shot from that die is shown in Figure 1.

The overall die dimension was 9" x 9". The resulting machine is shown in Figure 2 and Figure 3.

As can be seen in Figure 2, the die proper consists only of the die plate and ejector pins while the die frame is formed by the machine clamp. The ejector plate is actuated by an ejector unit built into this machine "platen."

The cover die is mounted on a floating platen which travels a short distance away from the nozzle every time the machine starts on its opening stroke. This is one of the measures necessary to assure fast operation and easy servicing. Clamping is provided with an intensifier and closing cylinder combination mounted in line as shown in Figure 3. The closing cylinder is prefilled at low pressure and the pressure is built up in the closing cylinder after pre-fill by causing the tandem cylinder to extend its piston rod into the closing cylinder, thus providing pressure multiplication in the ratio of the tandem intensifier

Editor's Note—For additional information on the hydraulic system referred to, the reader is directed to the article, "Four Second Cycle Die Castings," August, 1949, APPLIED HYDRAULICS MAGAZINE.

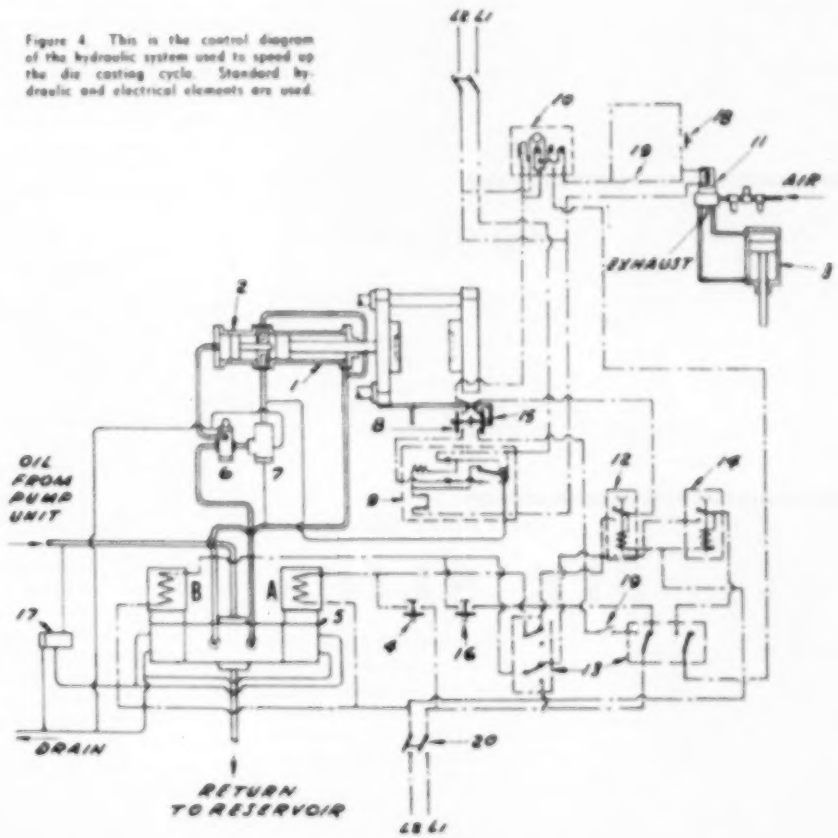
cylinder piston area to rod area. Depending on requirement, the cylinder shown may be operated on 500 to 700 psi line pressure with an intensifying ratio of 6 to 1, producing intensified fluid pressure in the locking cylinder of 3000 to 4500 psi respectively. This results in a total locking force of 15 to 20 tons respectively.

The intensifier unit is shown in Figure 4. This device permitted omission of high pressure pump equipment, minimized high pressure lines leading to and from the machine to a short length of approximately 12", necessary to reach a check valve, and permitted the use of a high speed hydraulic system with its inherent advantages over a toggle system as applicable for a machine of this size.

The control diagram of the machine as shown in Figure 5 calls for standard hydraulic and electrical elements.

The main Four Way Valve (5) admits low pressure to the locking cylinder (1) affecting die closing. The low pressure oil is guided through a check valve (7). Sequence valve (6), ahead of that check valve, permits entry of low pressure fluid in proper time sequence to the intensifier cylinder, built in tandem with the locking cylinder. The stroke of the intensifier cylinder is just sufficient to make up for any bypass loss that might occur in the locking cylinder. Pressure built up as a consequence of locking of the die and simultaneous tripping of a limit switch due to the closed position of the die actuates the circuit for the shot cylinder, thus providing both position and pressure interlock for the shot. The air actuated shot cylinder 3 will now advance and thereupon retract after a preset time dwell. Die opening will follow, after the shot cylinder is retracted whereby a controllable time delay before opening may be introduced.

Figure 4. This is the control diagram of the hydraulic system used to speed up the die casting cycle. Standard hydraulic and electrical elements are used.



TROUBLE...

Ever stopped to add up the losses that start piling up the minute a casting gets stuck? Machine down-time starts, direct labor continues, but on top of that...

HUDDLE

you're likely to need trouble-shooters to look into the matter. On tricky jobs, a lot of non-profit man-hours may have to be charged off before the trouble is stopped. In many cases, improper die lubrication is to blame — a problem that's

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to correct with Die Slick — the one die lubricant consistently used by better than 78% of all die casters. It virtually eliminates sticking, scoring, soldering; is non-staining; comes in five grades to suit all requirements.

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5403 Kemp Road, Dayton 3, Ohio

The control circuit permits fully automatic cycling, semi-automatic operation or individual operation of each element for set up work. A main safety switch will cause the machine to stop in any position and come back to the "die open, shot plunger up" starting position. Alternately, another safety switch will effect stopping of the cycle at any point.

The machine, as shown, is capable of cycling at a maximum of 1400 strokes per hour. The actual operating speed will depend on the casting and has been found practical at approximately 1200 shots per hour for the die shown. The average very long production run, including down time for minor repairs, die lubrication, occasional stickers, etc., was found to be approximately 900 shots per hour.

Operation at that rate poses certain demands with regard to machine alignment, balance of cooling in the die versus cooling in the sprue, pressure build-up and ease of ejection. The success of this high speed operation is attributed in no small part to the provision of machine platen cooling, preventing any unwanted change in tie rod spacing; provision for very effective cooling of the sprue such that the hot metal is actually pinched off without any dripping; and provision for a suitable injection plunger arrangement which is tight enough to create the vacuum necessary to suck back any molten metal from the nozzle upon back stroke, yet not tight enough to seize or score.

Successful operation of a battery of these machines over several years has proven again that it pays, on occasion, to consider the machine as no more than one part of the tooling for the job. With that viewpoint, it is possible to incorporate certain features that will make a specific job economical and easy of accomplishment, and also to omit a great number of things that would otherwise be found in die casting equipment, whenever such equipment is built for general purpose jobbing work.

DIE CASTINGS HAVE SUPERIOR ELECTRIC PROPERTIES

THE electrical properties of aluminum, together with its advantage as a lightweight structural material, are employed by The Superior Electric Company of Bristol, Conn., in several of their Powerstat *variable* transformers for voltage regulation.

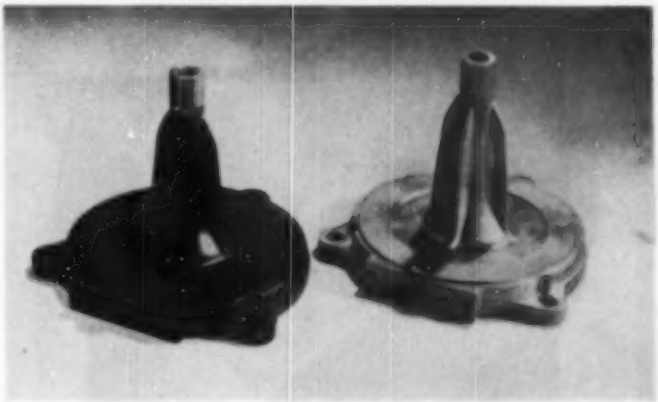
A number of these aluminum parts are formed by the die casting method because the shapes and quantities involved favor this type of fabrication. Typical of aluminum die castings used by Superior are those in the Type 116 Powerstat, Figure 1, which provides continuously variable voltage for loads up to 1 KVA.

This is a lightweight, inexpensive unit operating within an important voltage range and it is therefore one of the highest production units in their entire line of transformers. The large quantity production has been a contributory factor in specification of die casting as a manufacturing process.

Other types of variable transformers in the line utilize die cast components where extensive machining may be eliminated or where a number of identical

1. HOUSING. The variable transformer pictured above provides variable voltage for loads up to 1 KVA and has a die cast terminal box that houses the on-off switch and protects terminals from accidental contact.

2. STRUCTURAL PARTS. The aluminum die casting below serves as a frame for the entire assembly of the transformer, acting as the main structural element for mounting other components.



Three Jobs for Die Castings in Electrical Equipment . . .

3. SPECIAL-PURPOSE ELEMENTS. The variable transformer, shown at right without its housing, uses a radiator disc of die cast aluminum to transmit electricity and dissipate heat generated by its operation.

parts occur in a single installation.

Three aluminum alloy die castings serve important functions in the Type 116 Powerstat. A silicon-copper alloy of aluminum corresponding to ASTM specifications SC7 is used for all of these die cast parts.

Most important is the spout-shaped casting shown in Figure 2 which serves as a frame for the entire assembly, and positions the coil and central shaft. The casting does not move and is not stressed but serves as the main structural element for mounting other components.

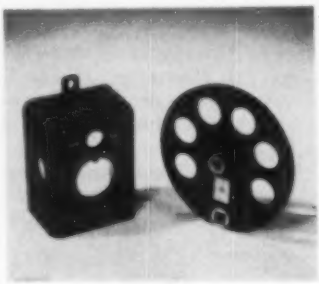
Of particular importance is the maintenance of close perpendicular relationship between the bottom surface and the upright "spout" of the casting. To prevent warping or distortion which might affect the perpendicular position of the "spout," four vertical fins and a generous radius between intersecting surfaces have been provided.

Electrical and Heat Transmission

The radiator disc is another aluminum die casting which performs an important function. Both the electrical and heat transmission characteristics of this metal are put to good use.

The circular disc, positioned around the central spout, helps in cooling the transformer during operation. This is accomplished by means of six holes cored through the disc as well as by the naturally high rate of heat transfer which is a property of aluminum.

The radiator disc also carries electric current from the contact shoe, which is a sliding contact,



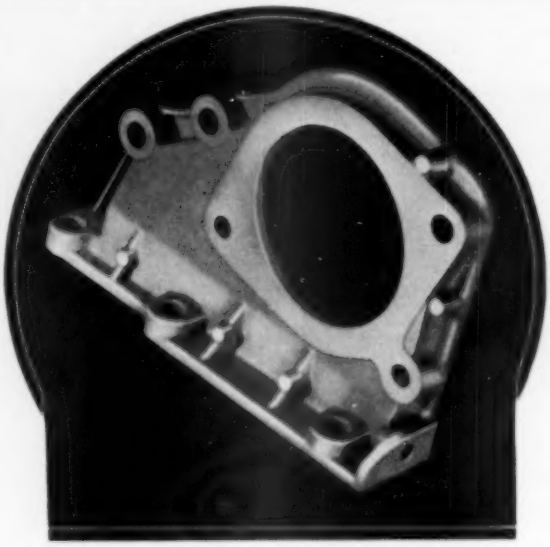
4 THE TERMINAL BOX and radiator disc pictured above are cast in aluminum to give light weight to the variable transformer in which they are used, as well as to take advantage of that metal's superior electrical properties.

for varying the voltage output. Although aluminum has a lower rate of electrical conductivity than copper, compensation is provided by means of the larger area of the aluminum conductor.

A third aluminum die casting is the terminal box which houses the on/off switch, plug receptacle, and anchor for the incoming cable and fuse. Its two main functions are to protect the terminals from accidental contact and to improve the appearance of the entire unit.

The housing had been produced formerly from a phenolic, but it proved to be not strong enough. The die cast housing

(Continued on Page 69)



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Die cast aluminum housings for these Drive-In Theater speakers made possible a 6-inch cone for high quality sound reproduction . . .

. . . WITHOUT BULKINESS

ONE phase of the amusement industry that has grown by leaps and bounds in the past few years is the drive-in theater, which combines movie going with the privacy and comfort of one's own car. Since their inception a decade ago, outdoor theaters have presented the problems of adequate sound reproduction.

DRIVE-IN THEATER SPEAKERS pictured above were made by a theater owner when smaller speakers failed to offer adequate sound reproduction. The front view, *left*, shows the clean, sharp detail offered by die castings, while the rear view, *right*, shows the cored hand grip which makes it easy to manipulate.

The regular theater-type sound system first used was highly unsuited for reaching hundreds of cars scattered over several acres of land. This system was replaced by "in-the-car" speakers which are hung on the window of each car and have volume control for individual adjustment.

Now a St. Louis drive-in theater owner, Paul Stroud, has formed Diecast Aluminum Speakers, Inc., to market a new speaker set that offers greater volume and better tonal quality. The set consists of two speakers, each enclosed in a two-piece die cast aluminum housing, and a junction box of die cast zinc to hold the speakers. The speakers have six-inch cones which reproduce the full tone range in comparison with the four-inch cones of other smaller speakers which do not reproduce the low tones satisfactorily.

Mr. Stroud formed his own company when he found that he was unable to purchase six-inch speakers which he, as a theater owner, knew were desirable. He was told that six-inch speakers would make too bulky a unit. But the light-weight die castings used, plus the design of three holding devices, a handle, handhold and grip overcame this problem.

Able to Cut Costs

Most noteworthy in the development of these speaker sets is the fact that their manufacture was undertaken by a businessman having little background in the manufacturing field. By selecting die castings, the manufacturer was able to produce a product with superior features

(Continued on Page 38)

OPERATION OF ZINC ALLOY PLAN TO BE REVIEWED AT MEETING OF DIE CASTING INSTITUTE

FULL discussion of the operations of the Certified Zinc Alloy Plan during the past year will engage the attention of members of the American Die Casting Institute when they hold their annual meeting September 19-21 at the Edgewater Beach Hotel in Chicago.

The Certified Zinc Alloy Plan will come up for review at the business sessions on Wednesday morning, at which time there will also be reports by the Metallurgical Committee of the Institute and the Safety Committee.

Of especial interest will be the latter report which will deal with progress being made in preparation of a Safety Manual for the die casting industry. The Institute hopes to publish this manual by the end of the year and will make it available to the industry without restriction.

At technical sessions on Tuesday afternoon, subjects to be discussed will be related to the production of quality die castings from the standpoint of the die casting machine, the dies, the metal, and production control. This, together with a question and answer period, will supplement the topic, "Operating A Jobbing Die Casting Plant," which was a feature of last year's technical sessions.

Schedule for the three-day event is as follows:

Tuesday, September 19—Meeting of the Board of Directors.

Wednesday, September 20—10:30 a.m., Annual business meeting of Institute members; 12:30 p.m., Annual Die Castings Magazine luncheon; 2 p.m., Technical sessions; 6:30 p.m., Cocktail party; 7:30 p.m., Annual Banquet at which the American Die Casting Institute will announce the winner of the first Annual Doehler Award and will present the winner with a check for $500 and a plaque.

Thursday, September 21—10 a.m., Cost Accounting panel, followed by a discussion of Government regulations, if any.

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Why not discuss your product problems with us? The economies of Badger die castings could well mean the difference between winning new markets in 1950 or losing your old ones.
DIE CASTING CORP.

STEPPING UP ASSEMBLY OF SMALL DIE CASTINGS

INCREASING OUTPUT of small assemblies can be accomplished by making screwdriving or nut tightening processes semi-automatic. How one company did this and increased hourly production of automotive switch assemblies by 57 per cent is described in an article in this issue beginning on page 47

ZINC and ALUMINUM

Die Castings

special department for
SMALL ZINC DIE CASTINGS

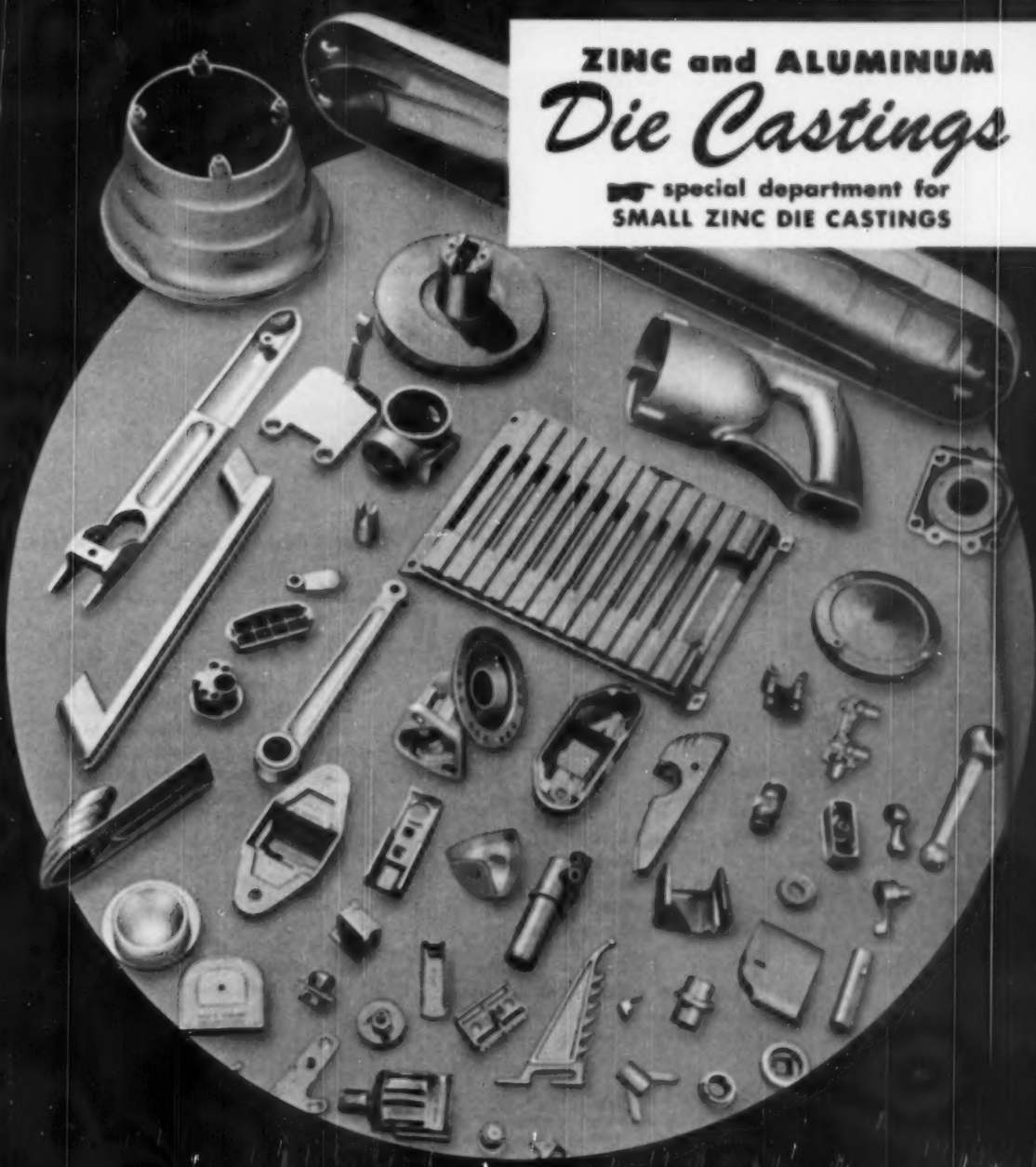

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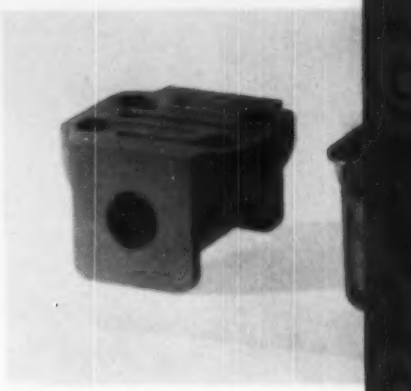
Figure 1. An air tight zinc die cast valve body, right, replaced a bronze precision casting, left, when the latter proved too porous.



THAT POROSITY PROBLEM

The "lost wax" method

HERE'S what the Taylor-Winfield Corp. gained by using a zinc die casting instead of a precision bronze casting for the valve body in the solenoid operated air valve used in their resistance welders.

1. A 60 PERCENT REDUCTION IN MACHINING costs as accurate casting and coring of holes eliminated several machining operations.

2. AN 84 PERCENT REDUCTION IN COST OF MATERIALS as the use of less expensive zinc reduced the weight of the valve body from 4 pounds 6 ounces to 2 pounds 2.5 ounces.

3. A 100 PERCENT INCREASE IN LIFE OF THE AIR VALVE as the number of operations per valve increased from approximately 15,000,000 to 30,000,000.

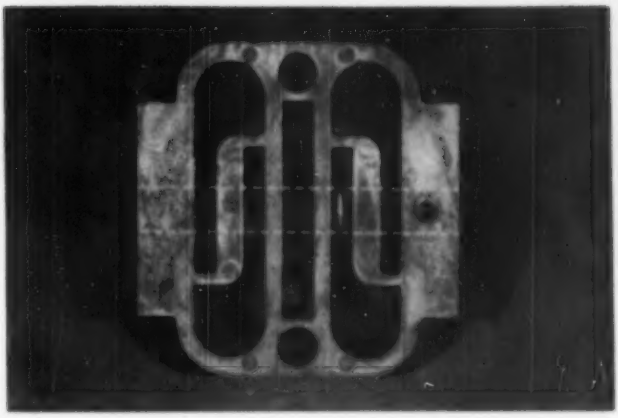
4. AN AIRTIGHT, NON-WARPING AND NON-SHRINKING CASTING with the characteristic smooth, easily painted finish of die castings.

A DIFFICULT job of coring that many thought impractical was the key to a change to zinc die cast valve body in a solenoid operated air valve used by the Taylor-Winfield Corp. of Warren, Ohio, in their electric resistance welders.

After having redesigned the valve body because of dissatisfaction with the bronze precision castings previously used, the company found a die caster who could undertake the intricate coring job. The fixed cores used to form the air ports had to be pierced at right angles by the sliding core that forms the bore of the valve body. The difficulty here was in coordinating the closing of the die with the movement of the sliding core through the fixed cores.

The change to a die cast valve body was made when the bronze castings made by the lost wax method proved to be too porous because of shrinkage, sacrificing air-tightness. These porosities resulted in leaky valve bodies at final assembly, resulting in expensive repairs and lost time. This same shrinkage in the main air passages of the

Figure 2. Invisible lines right show the bore of the valve body which is made by moving a sliding core through the fixed cores that form the air ports. This difficult job of coring was thought impractical by many.



roduced castings that were too porous for this valve body.

valve body called for a great deal of machining to open up the passages and smooth their surfaces to insure smooth air flow with little pressure drop.

The use of die cast valve bodies remedied these conditions. The resulting castings are airtight, non-warping and non-shrinking and have the characteristic smooth finish of die cast parts. The initial run of 300 die cast bodies produced 300 castings without porosity or other imperfections.

Cast to size with all holes cored, the casting needs only a minimum of machining, reducing machining costs by 60 per cent, and saving 84 per cent on cost of materials with a weight reduction from 4 pounds 6 ounces to 2 pounds 2.5 ounces.

But, in addition to correcting the specific difficulties encountered in bronze castings, the new die cast valve bodies of zinc increased the life of the air valve from approximately 15,000,000 operations to 30,000,000 operations, increased air capacity and yielded a better appearance to the casting.

In fact, the change was so successful that the company is now marketing the solenoid operated air valves as independent

Figure 3. So successful was the use of zinc die cast valve bodies in the air valve, *left*, that the company now sells them as independent units.

Figure 4. However, the company still makes wide usage of the air valves in its electrically and air operated welders. The welder pictured at *right* is air operated.

units to other manufacturers, besides using them on their own machines.

The reduction of machining costs came as a result of the elimination of several machining operations and much bench work. These include the elmination of stock removal on the bottom and both ends of the casting by shapers and milling machines. Now, these surfaces are merely cleaned off and smoothed with a belt sander. And, since all holes are cored to size, all drilling operations are eliminated. Tapping operations performed on radical drill presses remain the same.

The one inch diameter hole in which the air valve's anodized aluminum spool operates is bored, as it was in the bronze casting, honed and buffed, but is no longer subject to warping.

The weight reduction is brought about by thinner wall sections than those found in the bronze castings. Thin as they are in comparison, the wall sections are relatively thick for a die casting, but are fairly uniform in thickness and show no surface blemishes or distortion. These thinner sections also allow larger air passages which increase the operating efficiency of the valve.

Good Bearing Properties

Also contributing to the efficiency of the valve and its longer life is the natural bearing property of zinc.

Better appearance is given to the product by a protective Cronak treatment which not only protects the valve body from industrial oils and greases and various air-line impurities, but also acts as a base for baking enamel that covers the valve.

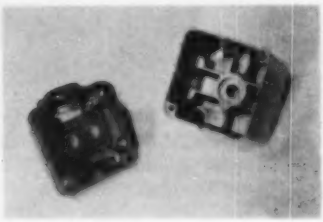


Figure 5. The solenoid housing and end cover of die cast zinc, pictured above, receive a protective Cronak coating along with the valve body. The coating also acts as a base for a baking enamel that covers the valve.

Also featured in the new casting are two bosses which are peened over to hold the company's nameplate and cast-in raised letters and numerals which identify the various air ports.

Also used in the air valve are a die cast solenoid housing and an end cover, or cap, both of zinc base alloy. The housing is a fairly complicated casting with cast-in bosses and ribs and several cored holes. It, too, needs only flash removal and tapping of holes. The end cover has two cast-in bosses which are peened over to hold a leather insulator. These two castings are fastened together and to the body by socket-head bolts. The body is in turn fastened to a steel cast base by similar bolts.

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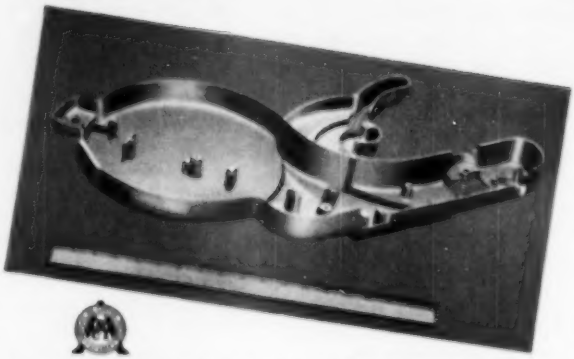

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THE TOOL-DIE ENGINEERING CO.
CASTING DIVISION
9210 LOREN AVE. CLEVELAND 5, OHIO

FINISHING DIE CASTINGS

A SECTION DEVOTED TO THE FINISHING PROCESSES

MACHINING—Most die castings require some machining operations. In this section will be found information to aid in planning and selecting the proper method and equipment for these operations.

ASSEMBLING—Die castings are generally assembled components. This section includes information on fastenings and methods for mass production assembly operations.

SURFACE FINISHING—Most die castings receive some type of surface finish such as plating, organic coating, anodic coating or chemical coating. This section contains information on the methods, processes and equipment used for the various surface finishing treatments on the die casting alloys.

CASE HISTORY No. 1
Roto-Finish has been used by the Shakespeare Company for over 10 years. Starting with one machine the Roto-Finish Department has been expanded so that at present there are 22 Roto-Finish production units operating 16 hours daily, 6 days per week. During this period, savings from 50 to over 75 percent have been consistently obtained with greater production, more uniform results and fewer rejections, than former methods produced.
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The original Roto-Finish Processes operating in industries all over the world are consistently breaking records for low cost finishing. The above case history is just one of many examples where Roto-Finish Processes have reduced finishing costs from 25% to 80%. This original mechanical finishing system of controlled rotary action GRINDS, DEBURRS, DESCALES, POLISHES, BRITEHONES AND COLORS metals and plastics at less cost than other methods.

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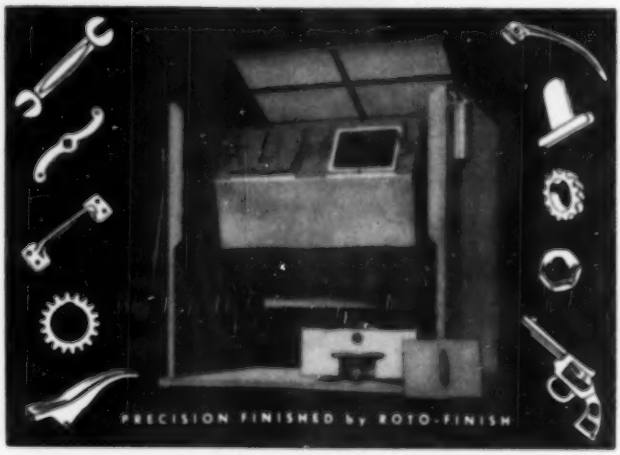

(Above — Model DW 45-2)

Roto-Finish COMPANY

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ORIGINATORS OF THE ROTO-FINISH PROCESSES

ROTO FINISH

PRODUCTION CLINIC
for finishing die castings

A monthly digest of current technical progress selected and prepared by the editorial staff of DIE CASTINGS. This section is devoted to finishing processes for all types of die castings, and is written specifically for the benefit of the production man.

PRACTICAL METHODS FOR FINISHING MAGNESIUM DIE CASTINGS

A number of protective and decorative finishes for magnesium die castings have been developed and are being applied on a production line basis. Chemical processes are also available for the treatment of magnesium alloys. Some may be used alone, but a combination of chemical treatment and a suitable paint system is recommended for most purposes. Mechanical surface finishing operations have been applied to give a higher output at lower cost in the manufacture of many articles. Improved types of tumbling machines for barrel finishing have made it possible to control operating variables within closely prescribed limits for finishing requirements. Recently, a process[1] has been developed which has placed the electroplating of magnesium on a practical basis, along with commercial electroplating on other metals. This new development opens up a field for the use of magnesium for many applications where a bright tarnish resistant surface is essential, or wear resistance is required.

The production man should keep in mind that a choice of the finishing treatment to use for any application of magnesium die castings should be made only after a careful study of the requirements of the finish with respect to such factors as corrosion resistance, abrasion resistance and appearance. The use of the various processes available must be also, carefully considered from the viewpoint of relative installation, maintenance and chemical costs.

Mechanical Methods

Polishing and buffing are used to produce an attractive bright metallic luster on magnesium parts. If protected by clear lacquer this type of finish has limited application for decorative purposes. Buffing is frequently used as a preliminary step prior to plating or chemical treatment. The data given in Table I is based on recommendations of the Dow Chemical Company for polishing magnesium alloys.[2]

Tumbling Finishing

Batch processing is receiving special attention in many production line finishing operations especially on small parts. Such methods have been found to reduce finishing time and establish other production economies. In many cases, these methods use mechanized barrel finishing procedures which incorporate refinements in equipment and materials employed, based on recent developments.[3] These improved methods have put such mechanical surface finishing operations as grind-

TABLE I
Typical Procedures for Polishing Magnesium Alloys

Operation	Abrasive	Type Wheel	Wheel Diam. inches	Wheel Speed fpm	Remarks
Rough Polish	60 to 100	Canvas Sheepskin or Felt	6 to 12	3000 to 5000	Grease Stick May Be Used
Medium Polish	100 to 200	Built Up Cloth	6 to 12	4000 to 6000	Grease Stick May Be Used
Dry Fine Polish	Dry Compound	Loosely Sewed Buff	6 to 12	3500 to 5000	———
Buffing	Tripoli	Loosely Sewed Buff 74 to 82 Count Cloth	10 to 14	6000 to 8000	———
Coloring	Dry Lime	Canton Flannel Buff	12 to 16	8000 to 12000	Medium Pressure To Produce Best Luster

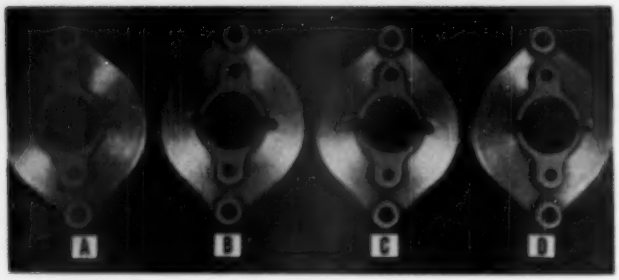

Figure 1, above. The group of magnesium covers shown above were tumbled by various sequences: A, ground 1¼ hours; B, ground 7 hours; C, ground 9 hours, polished 3½ hours, and britehoned 1 hour; D, ground 9 hours, polished 3½ hours, and britehoned 3 hours.

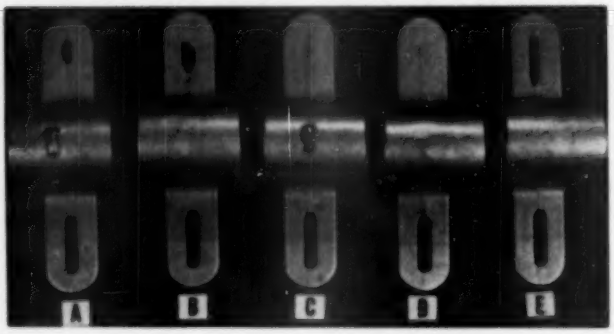

Figure 2, above. Bicycle brackets pictured above were finished by tumbling methods: A, no flash removal, ground 7 hours; B, flash removed on wheel, ground 9 hours; C, no flash removal, polished 3½ hours and britehoned 3 hours; D, flash removal by wheel, roto ground 9 hours, polished 3½ hours and britehoned 1 hour; E, flash removed by wheel, ground 9 hours, polished 3½ hours and britehoned 3 hours.

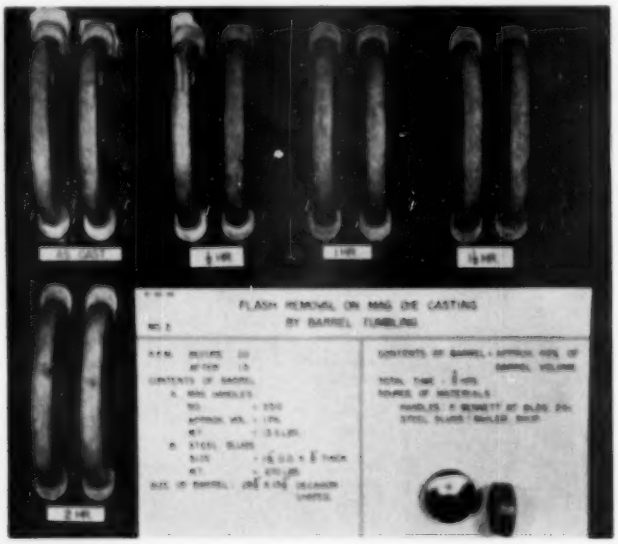

Figure 3, left. Illustrated is flash removal on magnesium die castings by barrel tumbling.

ing, deburring, and coloring of small magnesium parts on a basis such that operating variables can be controlled.

One tumbling finishing technique employs wet mixtures of compounds and chips developed for the method*.

Two types of chips are used with this finishing method. Grinding chips are used for grinding and deburring. They are available in a number of different sizes. Large-size chips provide a faster cutting action but leave a rougher surface than the smaller, slower-cutting chips. Britehoning chips may be used to produce a fine, smooth, lustrous surface. The size and type of chips used depend on such factors as size of part being polished, degree of luster desired, and number and location of openings in the work being tumbled. Steel balls or other highly polished steel coloring media can be used when desired.

In all "Roto-Finish" tumbling, grinding, deburring, and britehoning procedures, the work and processing chips are used with water to which certain recommended compounds are added to increase the cutting power of the chips. It has been pointed out that these compounds also perform other important functions: lubrication of both chips and parts; maintenance of compartment and chip mass in clean condition; and prevention of glazing or loading of chips with fine metallic particles removed in processing work.

Tumbling methods can also be used to impart a final bright lustrous finish to magnesium parts that have passed through the other tumbling procedures. Steel ball coloring is usually employed for this purpose. However, such a tumbling process tends to peen the parts rather than cut or grind them, and thus does little to cover any surface defects in the metal. The coloring solution is generally used warm to prevent scum formation on the work. The tumbling solution is

*The "Roto-Finish" method was developed by the Sturgis Products Company, Sturgis, Mich.

added to the barrel in a quantity that is sufficient to "blanket" both the magnesium parts and steel balls with a two-to-four inch layer of solution. In many cases the unit is rotated for approximately one hour; if a higher luster is desired, a somewhat longer tumbling period is used. The parts are thoroughly rinsed in hot water after tumbling. Drying of the parts may be accomplished by tumbling in clean sawdust, or by heating in an oven or using a centrifugal dryer. As a finishing process, precision tumbling offers several important advantages to the manufacturer using magnesium die castings.

Cleaning

Cleaning is an important step in finishing magnesium parts, whether chemical treatments or plated coatings are to be applied. The effectiveness of coating processes depends to a marked extent upon removal of all surface contamination. Where work is contaminated with oil and grease, as in the case for other metals, such contaminants should first be removed by means of solvent or vapor degreasing in order to prevent a build-up of oil and grease on the alkaline cleaner. Since magnesium, as contrasted with aluminum, is not appreciably attacked by caustic solutions, alkaline cleaners high in caustic, similar to the type used in cleaning steel may be employed. It has been recommended that an alkaline cleaning solution have a pH value above 11 for best results with magnesium.[3]

A satisfactory cleaning bath recommended[4] by the Dow Chemical Company for use as a soak cleaner or as an electrolytic cleaner can be made up according to the following formula:

Trisodium Phosphate
($Na_3PO_4.12H_2O$) ... 4 oz./gal.
Sodium Carbonate
($Na_2CO_3.10H_2O$) ... 4 oz./gal.
Soap (or suitable
wetting agent) ... 0.10 oz./gal.

The solution should be operated at 180-212°F. Some form of agitation is desirable if the bath is operated below the boiling point. An immersion time of 5 to 15 minutes is usually satisfactory. When used as an electrolytic cleaner, the bath is generally operated in the range 160-180°F. In

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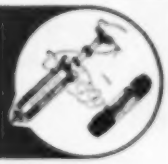

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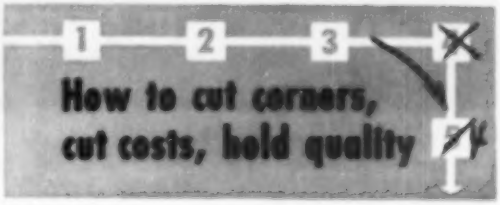

OAKITE metal-cleaning procedures can make an entire production operation easier, cheaper, quicker. Here are two examples:

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2. New Brass Cleaner Makes Big Savings A large electroplating job shop cleans brass with a new Oakite formula that minimizes tarnishing and rejects; cleans so well that, in many cases, a copper strike is dropped from the plating cycle.

FREE Write Oakite Products, Inc., 34G Thames St., New York 6, N. Y., for the new 44-page booklet *"Some good things to know about Metal Cleaning"*. Subjects:

Machine cleaning	Tank cleaning	Electrocleaning
Pre-paint treatment	Pickling	Paint stripping
Steam-gun cleaning	Burnishing	Rust prevention

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OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS · METHODS · SERVICE

such a case the soap should not be added. The work is made the cathode and a direct current of 10-20 amp./sq. ft. of cathode area is applied for one to three minutes. In some cases a longer treatment time may be required. Rinsing after the alkaline cleaning must be very thorough to avoid contamination of the chemical treatment baths. Steel tanks with suitable ventilation are satisfactory for the alkaline cleaning solutions.

A heavy duty alkaline cleaner having the following composition has been recommended prior to formation of a chemical anodic coating:

Sodium Carbonate
($Na_2CO_3.10H_2O$) ..... 3 oz./gal.

Sodium Hydroxide
(NaOH) ..... 2 oz./gal.

The cleaning bath is operated hot at 190-212°F.; cleaning times range from 3 to 10 minutes. For immersion cleaning parts are simply immersed in the bath. If direct current is available, the parts are made cathodes in the bath and a current density of 10 to 40 amp./sq. ft. at 6 volts is applied. Cathodic cleaning requires less time than the hot solution cleaning alone.

For cleaning prior to electroplating, one procedure that has been suggested[1] is that parts be soak cleaned for 3 to 5 minutes at 180-212°F. in an aqueous alkaline cleaning solution containing 4 to 12 oz./gal. sodium hydroxide and 4 oz./gal. trisodium phosphate. Cathodic cleaning for 30 seconds to 1 minute in this solution at 20 to 40 amp./sq. ft. at the end of the soak cleaning period is also recommended. A wetting agent or soap may be added to this cleaning solution to improve its detergency.

Chromate Chemical Treatments

A number of chemical treatments are available for magnesium alloys based on chromate coatings. These treatments produce a surface with a passive film resistant to corrosive attack and provide a good paint base free from alkaline characteristics which tend to cause peeling of organic coatings applied to magnesium. Procedures for three of the most commonly used treatments of this type as outlined[2] by W. S. Loose, Dow Chemical Company in the recent CORROSION HANDBOOK (John Wiley & Sons) are as follows:

Chrome - Pickle — Dip magnesium parts for ½ to 2 minutes in a bath composed of 180 g./L. sodium dichromate ($Na_2Cr_2O_7.2H_2O$) and 187 ml./L. of conc. nitric acid (HNO_3) maintained at room temperature. Hold 5 seconds in the air after removing from bath; rinse and dry.

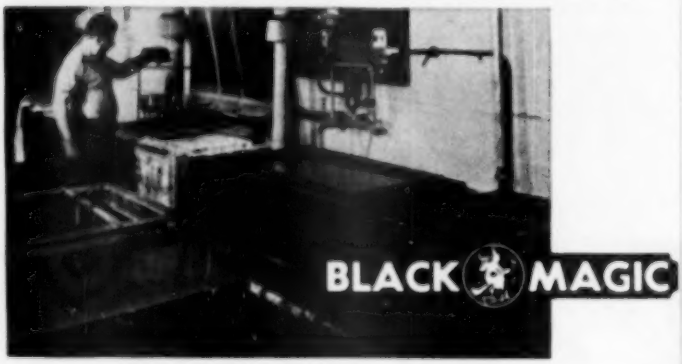
Sealed Chrome Pickle — Same as Chrome-Pickle above but followed by a sealing treatment in a boiling bath containing 100-150 g./L. of sodium dichromate for 30 minutes.

Dichromate—Magnesium parts are dipped for 1 minutes in an aqueous solution containing 15 to 20% by weight of hydrofluoric acid (HF) maintained at room temperature. Parts are then rinsed in cold water, following which they are boiled for 45 minutes in a 10-15% sodium dichromate aqueous solution. Alternately, parts may be treated for 30 minutes in this above solution saturated with MgF_2 or CaF_2. After treatment parts are rinsed and dried. The dichromate treatment was reported to give the best corrosion resistance and paint adhesion although all of the treatments have a marked effect in improving these properties.

Dow Treatment No. 8 for a Black Finish

A process known as Chemical Treatment No. 8 has been developed by the Dow Chemical Company to

(Continued on Page 69)



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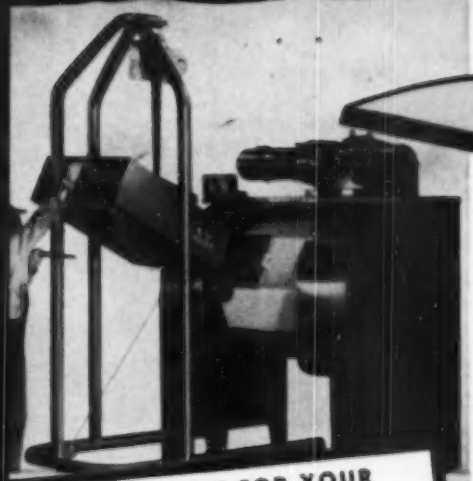

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ONE WAY OR ANOTHER, it pays you real dividends to finish castings in Unichrome Dip. You not only improve the product, but the cost picture as well.

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IF YOU CHROMATE-TREAT with Unichrome Dip, you produce a yellow to olive drab finish on unplated castings which has even better corrosion-resistance than the bright finish. And since you use a more economical solution, *you save even more!*

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A chemical treatment, Unichrome Dip produces a finish integral with the zinc. A 5 to 20 second dip does it. Tolerating impurities, the solution is easy to control. It works equally well for bulk handling of parts or in automatic equipment.

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Power Nut Drivers Increase Assembly Production by 57 Percent

THE MAJORITY of small assemblies that include die cast parts involve the driving of one or more screws, the tightening of nuts, the driving of rivets or other similar fastening operations.

Because of the apparent simplicity of these operations, production engineers sometimes overlook the possibilities for multiplying output by making these screw driving or nut tightening processes semi-automatic.

A large number of man hours are consumed in positioning each screw or nut and applying the driving tool manually. Time and motion studies indicate a great deal of wasted hand movement with a consequent loss of time.

An improved method for handling such operations is the use of a hopper fed power screwdriver actuated by foot switch or treadle. By this mechanism, the fastener is fed into position and tightened with a single stroke. Ordinarily the only manual operation is to place the assembly in position beneath the driving head.

The efficiency of this type of equipment is well illustrated by a setup recently installed at the Mitchell Division of United Specialities Company in Philadelphia, Pa. The operation is the driving of three nuts onto threaded studs in an automotive switch assembly. Special lock washers are used with the nuts.

The previous method of assembling is illustrated in Figure 1. Four operators are seated

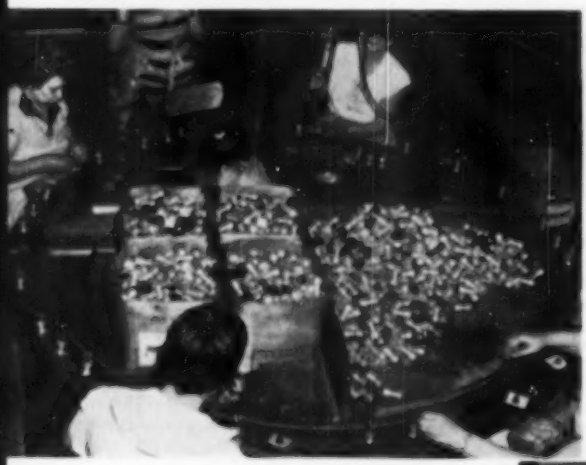

Figure 1. Manual positioning and tightening of lock washers and nuts on threaded studs of an automotive switch assembly by four workers, above, yielded an hourly average of only 175 complete assemblies per worker.

Figure 2. A single operator using a hopper-fed, power-operated nut driver to do the same job, right, completes 275 assemblies per hour, an increase of about 57 per cent.

around a circular table with a rotating outer edge. The die cast units are positioned on holding fixtures attached to the rotating perimeter. These holding fixtures consist of keyed shafts to hold the housings in a vertical position and to prevent them from spinning.

Three operators load housings on the fixture and place the lock washers and nuts on the threaded studs while the fourth operator applies a pneumatic socket wrench to tighten each assembly.

With this arrangement, four operators can complete 700 assemblies (with three nuts each) per hour. This represents an average *output of 175 assemblies per worker.*

The type of machine selected by United Specialities to increase production rates of operators is the hopper-fed, power-operated nut driver manufactured by Detroit Power Screwdriver Company. The new set-up is shown in Figure 2.

One operator working at the power nut driver *can complete 275 assemblies (of three nuts each) per hour, which is an increase of about 57 per cent in hourly production.*

An interesting three-position fixture is used in conjunction with the power nut driver. It consists of a half socket mounted on a triangular sliding base. The die cast housing is slipped into the socket which holds it in a definite vertical position. Then the fixture is moved against locating stops at each apex of the triangle to position each of the studs successively beneath the machine spindle.

The operator first loads the lock washers onto the studs by hand and then slips the unit beneath the spindle, rapidly applying and tightening the nuts by means of a foot switch that simultaneously positions and drives one nut while permitting the next nut to slip into location, ready for the next actuation.

Thus, the nuts are fed down the chute from the hopper and can be applied without any greater time lapse between operations than is required for the operator to insert the next unit beneath the spindle.

This type of machine is capable of driving any nut within its range that can be selected and fed in a uniform position. Also, no more clearance is needed around the stud than is required for a standard socket wrench.

Adaptable to Small Die Cast Assemblies

This type of machine is adaptable to almost any small die cast assembly where screws or nuts are to be applied. The rate of speed will be higher where a simple screwdriving or nut setting can be done without a preliminary step such as the manual feeding of lock washers.

In some instances where machine screws and lock washers are to be applied, it is possible to obtain these fasteners preassembled so that both will feed simultaneously.

The fact that die castings can be obtained with screw holes cored to accurate size sometimes makes it possible to use thread cutting screws applied by power screwdriver, thus dispensing with tapping operations and also, manual insertion and driving of the screws.

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A highly efficient cleaner, especially for the electrolytic cleaning of steel and all ferrous alloys prior to electroplating. Also may be used as a soak cleaner or a combination of soak and electrolytic. Compounded exclusively by Du-Lite for removing grease, oils, and drawing and buffing compounds. Economical in use and in price.

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Du-Lite has perfected this new all purpose cleaner to be used as a soak, electrolytically, or both in combination for all metals, except aluminum. Du-Lite No. 37 is especially recommended for the cleaning of stainless steel, steel, zinc, nickel plate and brass. Will not tarnish die castings or brass. Competitively priced.

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NEW PRODUCTS

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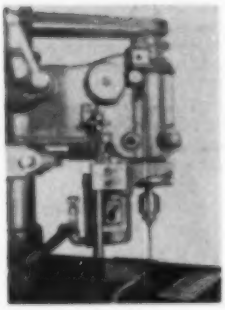
DRILL PRESS ATTACHMENT PROVIDES STEADY RESISTANCE



A new drill press attachment that provides uniform resistance for pneumatic drill press feed and other air cylinders has been marketed by the Mead Specialties Co. of Chicago, Illinois. Called Hydro-Check, the device can be used to meet situations requiring a steady resistance to the power of the air feed, or increased resistance at a definite point in the stroke.

The device is easily attached to the drill press feed through two holes in the mounting block, and connected to the head of the drill press by means of a small bracket as illustrated. Two collars on the ram can be set at any desired point. The Hydro-Check attachment can also be used with single acting air cylinders to provide a cushion effect for certain jobs.

For additional information circle No. 1 on the Reader Service card.

TAPER ATTACHMENT FITS ENGINE AND TOOL ROOM LATHES

Simply designed and provided with universal attachment clamps, the new master-taper attachment made by the Master-Taper Co. of Chicago, Illinois, can be mounted on all makes of engine and tool room lathes in a few minutes. It is claimed to make taper turning, boring and threading operations almost simple as straight-line tool operations.

This new, extra-heavy duty taper attachment is suitable for lathes having a swing up to 36 inches and will enable such a lathe to cut a taper of 20° or 4 inches per foot and 12 inches longitudinally at one setting. Smaller size attachments for bench lathes have a capacity of 16½° or 3½ inches per foot and 7½ inches longitudinally.

The sliding fixture on the attachment has a long bearing surface with gibs to compensate for continuous usage. The swivel bar has V-ways with the ends graduated—one in degrees, the other in inches per foot.

For additional information circle No. 2 on the Reader Service card.

PRECISION DEVICE FOR MARKING METAL, PLASTIC COUNTER WHEELS

A newly designed fixture coupled with special precision tooling allows the Model 9A machine made by the Accumark Co. to mark metal and plastic counter wheels, meter wheels and similar parts with greatly increased accuracy.

A die closing cam has been provided to allow stamping immediately adjacent to starter pins or cams on the outside diameter of the wheel blank. Attachments for hot stamping thermoplastic materials and most thermosetting materials can be furnished as interchangeable parts. These attachments include thermostatically controlled heating units and adjustable automatic tape advance mechanisms.

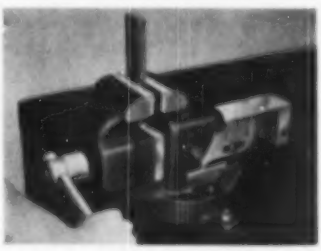
The Model 9A marking machine is available in hand operated, as well as air and electrically powered models. Standard models take wheels up to 1½ inches in diameter, but special construction will cover the range to approximately 3½ inches.

For additional information circle No. 3 on the Reader Service card.

SLIDE ACTION MACHINIST'S VISE ELIMINATES HANDLE SPINNING

A new quick action machinist's vise that uses a patented fast slide action has just been announced by the Dodge Manufacturing Co. of Mishawaka, Indiana. Known as the Dodge Slide-Set Vise, the product is now available through industrial distributors.

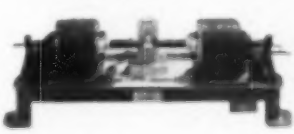
The vise opens or closes to any position in one second through a



push-pull action which eliminates spinning the handle. It weighs 58 pounds and combines the full power of a conventional type vise with an instant slide action that speeds production, reduces operator fatigue and increases efficiency on bench and assembly operations. It is provided with either a swivel or stationary base and is built in a 4 inch size only.

For additional information circle No. 4 on the Reader Service card.

NEW MACHINE OFFERS SPEEDY COUNTERSINKING AND CHAMFERING



A new machine for fast countersinking, chamfering and boring is being manufactured by the Black Drill Co. The machine, as illustrated, consists of a cast iron base on which are mounted two traversing shaft motors with opposed cutting tools mounted in collets at the ends of the shaft—plus a tool post and work holder located at the center of the assembly.

The tools are brought to the work by depressing a foot pedal which actuates both shafts simultaneously. Each shaft is equipped with a micrometric adjustment for close control of cutting depth.

Motors ranging from one-third to 1 hp can be used depending

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upon the size, cutting speed and material to be machined. The maximum stroke limited by motor shaft travel is 2 inches, permitting a wide variation in the types and sizes of work that can be performed. For work that does not require the two motor set-up, single motor units are available.

For additional information circle No. 5 on the Reader Service card.

FOUR TON PUNCH PRESS HAS INCREASED DIE CAPACITY

Increased tooling height has been added to the 4-Ton Standard punch press made by Benchmaster Manufacturing Co., Los Angeles, California. Where open height, ram up, was formerly 6¼ inches, the improved model now possesses a full 8 inch vertical working dimension. This additional height is valuable for adapting special tooling, for easing set-ups and for permitting use of dies and die sets too large for the Standard 4-Ton Benchmaster.

Other improvements announced by the manufacturer are a new heavy-duty clutch dog made of special shock-resisting steel, clutch linkage doubled in thickness for greater strength and rigidity and a clutch wedge designed to incorporate a special "safety-stop" solid block.

For additional information circle No. 6 on the Reader Service card.

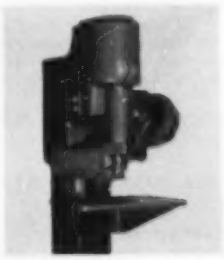
ALUMINUM ETCHING COMPOUND HAS NON-SLUDGING PROPERTIES

Pennsalt AE-18, a new, highly concentrated alkaline compound for etching aluminum without forming hard sludge deposits on the bottom of etching tanks, is now being offered by the Special Chemicals Department of the Pennsylvania Salt Manufacturing Company. It is claimed that the new etching compound gives a bath of long life, assures uniform etching and at the same time avoids the rock-like sludge deposits.

Packaged in a 300-pound non-returnable drum, Pennsalt AE-18 is recommended for use in concentrations of five to seven ounces per gallon of water at temperatures of 140 to 150F. Depending upon the degree of etch desired, the parts may be immersed for 30 seconds to 10 minutes, followed by rinsing in a clear water dip or spray.

For additional information circle No. 7 on the Reader Service card.

NUT DRIVING MACHINE ELIMINATES MANUAL HANDLING



Detroit Power Screwdriver Co. has designed a complete machine primarily for the purpose of driving nuts semi-automatically or automatically, entirely eliminating the manual handling of the nuts at any time, except to load the rotary barrel-type hopper periodically with a fresh supply of nuts.

The hopper keeps the machine continually charged with an ample supply of nuts and feeds them in a pre-positioned manner to the driving spindle, making it necessary that the operator handle only the parts to be

(Continued on Page 52)

THE ANSWER IS

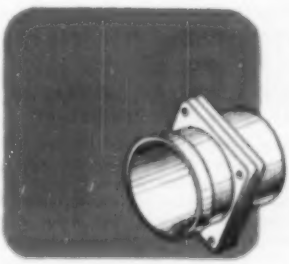
DYKAST

for finishing die-castings *without pretreatment*

• When die castings, particularly zinc and aluminum, are *already* clean—they need no further pretreatment. Finish them with Dykast Lacquer Enamels. You save one complete labor operation and an important amount of production time.

They *air-dry* in five to ten minutes—and provide a tough, durable coating that is flexible. These enamels are available in a wide variety of colors . . . or clear. They have excellent adhesion, suitable for many different types of products.

Dykast Lacquer Enamels are applied by either the spray or the dip method. For full details write for Technical Data Bulletin #113 and Standard Color Card. Better yet—let an M&W Sales Engineer discuss your requirements with you. It may save you both time and money.



PIONEERS IN PROTECTION

M&WCo. 1876

. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY

Newark 4, N. J. • Chicago 12, Ill. • Los Angeles 34, Calif.

Pacific Coast Division: SMITH-DAVIS CO., 10751 Venice Boulevard, Los Angeles 34

MANUFACTURERS OF INDUSTRIAL FINISHES

assembled by placing the assembly in the locating fixture mounted on the work table of the machine.

The machine can handle nuts measuring from 5/16 to 11/16 inches across flats and is equally efficient for special nuts, such as jam, castellated and lock nuts. The machine can drive any nut within its range that can be selected and fed in a uniform position.

For additional information circle No. 8 on the Reader Service card.

GREASELESS LIQUID ABRASIVE FOR BURRING AND POLISHING

Leabramoat, a greaseless, non-flammable, quick drying liquid abrasive for burring and polishing has been developed by the Lea Manufacturing Co., makers of polishing and buffing compounds. The abrasive is available in grit sizes from 100 to fine micron. It can be sprayed or brushed on polishing and buffing wheels and is suitable for hand or automatic production methods. It can also be used for renewing worn abrasive belts.

A companion product, Leamoat, a liquid polishing cement has also been developed. The cement can be sprayed on wheels prior to loading up with loose abrasives and features flexibility and long life.

Both of the new products are available in 5, 30 or 50 gallon containers.

For additional information circle No. 9 on the Reader Service card.

POLISHING BELT CAN BE RESET UP TO 1000 TIMES

A Rayon-Resin polishing belt that will last in excess of 1000 set-ups under average conditions is being distributed by the Industrial Lubricants Company, Inc., Detroit, Michigan. According to the company, the belts have been tested "on the job" in factories throughout the country and been used and reset in excess of 650 times and are still in use; there has been no raveling and stretch, and shrinkage has been less than 2 percent.

The belts are of a patented construction. The pulley side is Neoprene vulcanized to the rayon polishing side. A special splice is used to join the belt which insures smooth running operation without kick.

Belts are available from 2 inch to 40 inch widths and in lengths from 96 to 168 inches.

For additional information circle No. 10 on the Reader Service card.

PORTABLE VAPOR STEAM GENERATOR SUPPLIES HIGH PRESSURE STEAM

A new portable vapor steam generator for chemical processing and other industrial operations supplies large quantities of high pressure steam for short or sustained periods. Made by Vapor Heating Corp., the machine develops 200 pounds working steam pressure in two minutes from cold water and makes over 3500 pounds of steam an hour, at 75 to 300 pounds steam pressure. This is accomplished by hot gases from a forced draft fuel-oil fire wiping over a patented 575 foot steel coil.

New features of Model 4635 include the addition of an economiser coil placed in the path of exhaust gases to increase output and efficiency, relocation of the motor to shorten the unit, better ignition spark, larger combustion space, and higher working steam pressure of the steam reservoir to 250 psi.

A 5 hp electric motor or gas engine supplies power to drive the water pump, blower, ignition and fuel pump. Overall dimensions of the machine including the steam reservoirs are 8 feet long, 4 feet wide and 6½ feet high.

For additional information circle No. 11 on the Reader Service card.

ANGLE-TYPE NUT SETTERS PROVIDE HIGH TORQUES

Two new angle-type nut setters to provide high torques for medium-sized nuts are announced by Keller Tool Co., Grand Haven, Michigan.

The new models, 16-C-43 and 16C-46 are designed with 12:1 gearing in the gear case which —coupled with 1:1 and 2:1 gearing in the angle attachments — provides torques of 30 to 60 foot-pounds. The small, compact angle attachments adapt tools to fast work in close quarters.

The new nut setters are part of the company's line of standard double-end and single-end attachments that offer complete interchangeability between attachments and gear case assemblies to give users a compact "tool kit" of angle-type nut setters for work in restricted areas.

For additional information circle No. 12 on the Reader Service card.

TAPPING UNIT HAS SPEEDS UP TO 20,000 RPM

A high speed, precision automatic drilling and tapping unit that utilizes either hydraulic or pneumatic power, offers one stroke or continuous cycling and has a rotating and reciprocating spindle that permits speeds up to 20,000 rpm has just been introduced by Hy-PneuMat, Inc., Milwaukee, Wisconsin.

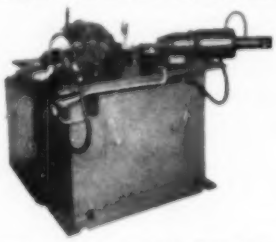
Named the HyPneuMat, the unit has a drilling and tapping capacity of 1/8 inches in steel and a 1/8 to 3½ inch stroke. Its features include automatic cycling, infinite adjustable speed, adjustable stroke for both direction, variable spindle speed, and dwell action adjustable from 0 to 120 seconds.

The unit is available in its basic form and with a wide selection of electrical and mechanical controls for almost every production need.

For additional information circle No. 13 on the Reader Service card.

MACHINE SPEEDS DRILLING OF WIRE HOLES IN HEX HEADS

A new type of machine for speeding up the drilling of wire holes in hex heads has recently been announced by the Gavro-Nelson Co. of Detroit, Michigan. The machine employs 3 Model HH Gavro-



Nelson automatic drilling units which drill three holes at once. The part is then turned and the 3 units are operated a second time to complete the six holes.

The first user of this machine reported a production rate of 288 pieces per hour, involving the drilling of 1728 holes, when drilling six No. 50 wire holes in a cap screw with hardness of 25 Rockwell "C".

According to the manufacturer, the machine can, with minor changes, be adapted to the drilling of multiple holes in other parts of similar size and character.

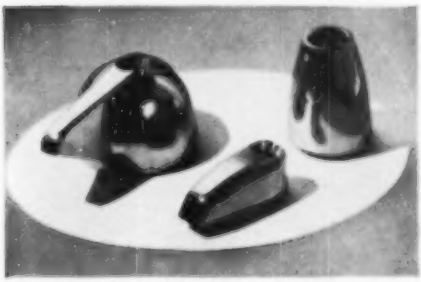
For additional information circle No. 14 on the Reader Service card.

PREVENT Blistering, Streaking
on zinc-base die-castings

with DIVERSEY No. 505

Sensational NEW
ELECTRO-CLEANER AND SURFACE CONDITIONER!

Actual photograph of blistering on zinc die casting cleaned with conventional cleaner.



Actual photograph of finished zinc die castings cleaned in new Diversey No. 505.

Designed especially for reverse current electro-cleaning of zinc-base diecastings, *new* Diversey No. 505 completely, *safely* removes all unwanted deposits! In addition, Diversey No. 505 helps condition the surface of the zinc, providing better adhesion between the electro plate and the base metal!

This unique, double-action of Diversey No. 505 helps provide a uniformly clear, brilliantly lustrous finished surface . . . one free from blistering, peeling and streaking! Diversey No. 505 is economical, easy to use and available now! Investigate Diversey No. 505!

For complete information on Diversey No. 505

THE DIVERSEY CORPORATION
Metal Industry Department
1820 ROSCOE AVE., CHICAGO 13, ILL.

THE DIVERSEY CORPORATION
METAL INDUSTRY DEPARTMENT
1820 Roscoe Ave., Chicago 13, Ill.

Gentlemen:
Please send me complete information on new Diversey No. 505.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

DMS

LOOK

what's NEW!

A WONDERFUL TIME AND LABOR SAVER

DETROIT NUT DRIVER

Again the Detroit Power Screwdriver Company leads the way . . . Having whipped the problem of production screwdriving by replacing slow hand methods with magazine fed power driven screwdrivers, it now breaks another bottle neck by the introduction of this new Nut Driver.

IT WILL REVOLUTIONIZE NUT DRIVING METHODS

Instead of the previous costly, slow method of placing the nut on the stud by hand and then tightening it by an air or electrically operated hand tool or a hand operated ratchet wrench, this machine will drive nuts semi automatically, or it can be set up for automatic operation, entirely eliminating the manual handling of nuts, except to load the hopper which feeds the nuts to the driving spindle. The operator has only to place the assembly on the locating fixture on the work table of the machine and actuate an electric foot switch.

WIDELY ADAPTABLE
Will Fit Your Requirements

Capacity: Nuts, ¼" min. to 1⅛" max. across flats . . . Equally efficient for special nuts such as Jam, Castellated, Lock, etc. . . . Machine will drive any nut within its range that can be selected and fed in a uniform position. Get our new catalog describing this new Nut Driver, also Power Screwdrivers, Motorized Hoppers and Special Assembling Machines. SEND SAMPLE ASSEMBLY FOR PRODUCTION ESTIMATE.

Mail Coupon for Catalog

DETROIT POWER SCREWDRIVER CO.
2021 WEST FORT ST., DETROIT 16, MICHIGAN

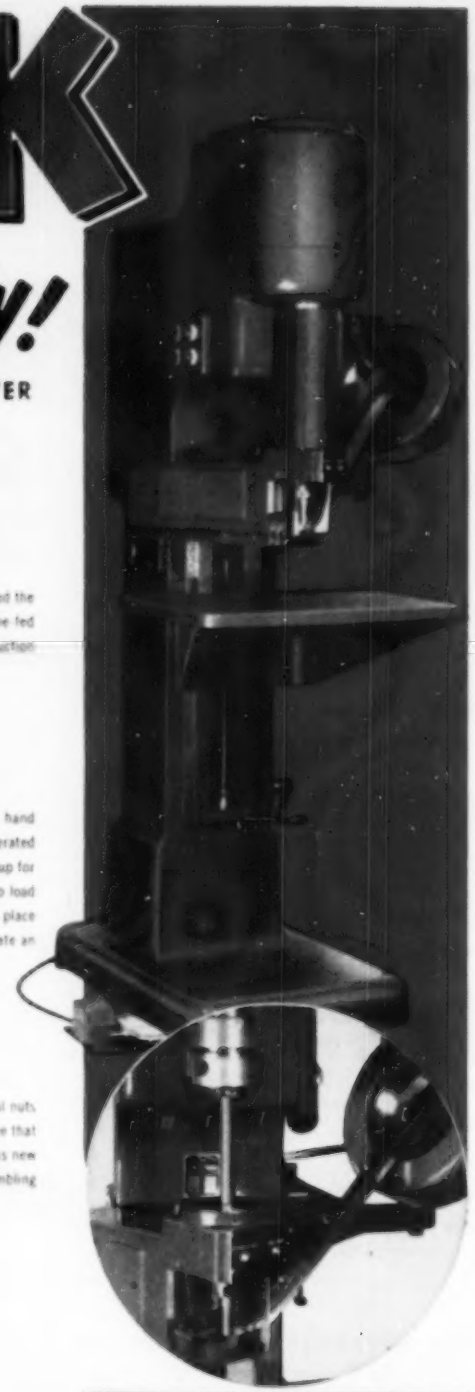
Yes, send along your new catalog . . . sounds interesting.

COMPANY NAME _____

BY _____

STREET ADDRESS _____

CITY _____ STATE _____



DETROIT POWER SCREWDRIVER CO.

2021 WEST FORT ST. DETROIT 16, MICHIGAN

USEFUL LITERATURE

For additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

25 AUTOMATIC SHOT CONTROL UNIT:

An automatic shot control unit that minimizes porosity in zinc and aluminum die castings and produces a sound, platable surface is described in literature offered by the Ring Valve Co. of Clawson, Michigan. The unit, an automatic hydraulic valve with only one moving part, controls plunger strokes and the resulting flow of metal into die cavities.

26 NON-FERROUS METALS DIRECTORY:

A directory of non-ferrous metals, including aluminum, zinc, copper, lead and magnesium die casting alloys, that are carried by Federated Metals Division of American Smelting and Refining Co. is now available. Also listed are Federated sales offices.

27 INFORMATION ON MASKING DEVICES:

Masking devices that are used to cover and protect surfaces during painting, plating and sand blasting operations are described in literature from Duggan Masking Devices of Detroit, Michigan.

28 FLAT HEAD SOCKET CAP SCREWS:

A new folder has just been published by the Mill Supply Division of the Bristol Co. on its recently announced line of flat head socket cap screws. The folder, Bulletin 881, gives full specifications and price information.

29 TUBING WITH CLOSE-TOLERANCES:

A new 16-page booklet, No. 105, on cutting costs with close-tolerance tubing, covering ferrous, non-ferrous and bimetallic applications, is now available from Tube Reducing Corp. Illustrated with drawings, photographs and tables, the colored booklet gives tolerance, finish and application data on compression formed tubing.

30 LENSES FOR ASSEMBLY AND INSPECTION:

Colorama Lenses made by Engineering Specialties Division of the Universal Engraving and Colorplate Co. are listed in literature offered by the company. Available in various degrees of magnification and diameter sizes, the lenses are used in assembly and inspection work.

31 BULLETIN DESCRIBES TRANSFORMERS:

A sixteen-page bulletin, P550, from Superior Electric Co., describes in detail both manually operated and motor driven variable transformers and line correctors. Included are performance curves, graphs, wiring diagrams and a complete rating chart that provides a quick selector index.

32 CONCENTRATE SHORTENS DRYING TIME:

Miskella Infra-Red Co. offers literature on its Dri-Water concentrate that is used to replace ordinary water for rinsing metals and other solid materials. The concentrate shortens drying time and reduces the amount of heat needed to completely dry-off surfaces for further processing.

33 PIPE PLUGS HAVE "DRYSEAL" THREADS:

Information on hexagonal socket pipe plugs which are threaded with "Dryseal" threads to eliminate leakage is offered by the U. S. Plug and Fitting Co. The threads that form a metal to metal sealing contact can be had in aluminum, brass, bronze and a special alloy steel and are available in sizes ranging from 1/16 to 4 inches.

34 SOLDERING KIT FOR ZINC DIE CASTINGS:

Bulletin 150-A from Fusion Engineering describes soldering kits containing nine kinds of paste-type alloys for soldering zinc die castings, aluminum, stainless steel, chrome plate, copper, steel and brass. Also described are fusion paste alloys for soldering and brazing various types of metals.

35 DYE PENETRANT INSPECTS ALL METALS:

A dye penetrant method of inspecting every kind of metal is described in new circular issued by Dy-Chek Co., a division of Northrop Aircraft, Inc. Called Dy-Chek, the process reveals pits, porosity, cold shut and can be used for both inspection and preventive maintenance.

36 SPECIAL BUILT ELECTRICAL EQUIPMENT:

Special electrical equipment made by the Electric Products Co. of Cleveland, Ohio, is featured in a colored, 10-page bulletin, No. 2-200, available from the company. Pictured in the amply illustrated booklet are specially built motors, generators, battery chargers and electrolytic power supplies.

37 CLEANING AND BUFFING COMPOUNDS:

Globe Compound Co., Inc., offers literature on its various cleaning and buffing compounds. Samples of the company's various compounds are also offered.

38 CORROSION-RESISTANT PLASTIC PAINT:

Tygon, a corrosion and chemical-resistant plastic-type paint made by U. S. Stoneware Co., is described in a 12-page illustrated bulletin offered by the company. A corrosion-resistance table in the bulletin lists the affect of various chemicals on the coating and recommends primers and surface treatments.

39 DIE CAST PORTABLE DRILL:

SpeedDrill No. 400 that uses die cast aluminum parts for strength, appearance and light weight is described in literature from the Speedway Manufacturing Co. The drill has ½" capacity and delivers a full half-horsepower at the drill point under normal load.

(Continued on Page 56)

Our method saves you time and labor figured not only in minutes, hours, days or months, but SECONDS AS WELL, through the remarkable speed of

DETROIT POWER Screwdrivers

In fact, you can **DRIVE SCREWS AS FAST AS ONE A SECOND**; a tremendous gain over the old slow hand method—Any kind of screws; machine, wood, brass, self-tapping, sheet metal screws, standard heads, special heads.

No danger of marring heads or stripping threads—and all screws are driven to uniform tension . . . Hopper fed, no handling of screws is necessary. Thousands of manufacturers have adopted this modern method of speeding production—You, too, should get further details. There is a Detroit Power Screwdriver to fit your requirements.

Our new catalog is just off the press—

Mail Coupon for Catalog

DETROIT POWER SCREWDRIVER CO.
5931 WEST FORT ST., DETROIT 16, MICHIGAN

Yes, send along your new catalog . . . sounds interesting.

COMPANY NAME_____

BY_____

STREET ADDRESS_____

CITY_____ STATE_____

10 METAL BLACKENING BATHS:

An illustrated, 8-page booklet is offered by Enthone, Inc., on its Ebonol blackening processes. In color, the booklet describes blackening baths for zinc die castings, as well as for copper, brass and steel.

11 GUIDE TO BETTER CUTTING TOOLS:

An illustrated, 20-page booklet from Illinois Tool Works explains how engineering ingenuity, production facilities and tool making skill assure maximum production efficiency of the company's cutting tools. Pictured are over 40 metal cutting tools, machines and inspection devices made by the company.

12 COLLECTING GRINDING DUST:

Suggestions for collecting dust from a typical four wheel grinding operation are among those offered in a new Bulletin, No. 616, available from the Aget-Detroit Co. of Ann Arbor Michigan. Described are unit-type dust collectors for industrial dusts and vapors.

13 DRILL PRESS SPECIFICATIONS:

Bulletin No. 402 prepared by South Bend Lathe Works consists of 4 pages printed in two colors and gives complete specifications and prices of the firm's new 14-inch bench and floor-type drill presses. Attachments and accessories are also illustrated, described and priced.

14 BUFFING COMPOUND DISPERSES IN WATER:

Literature is available on a water dispersible metal buffing and coloring composition developed by Hanson-Van Winkle-Munning Co., for use on all non-ferrous metals except nickel. Designated as No. 4-S-10, the composition can easily be removed in aqueous solutions, using a mild alkaline cleaner without current.

15 BROCHURE LISTS TECHNICAL SERVICES:

"All Under One Roof" is a brochure that portrays the work of scientists, engineers, consultants and laboratories at Sam Tour & Co. Illustrated with action photographs, this brochure explains the scope of services available from this organization, including research, process development, product development and production methods.

16 SHANK-TYPE DOVETAIL CUTTERS:

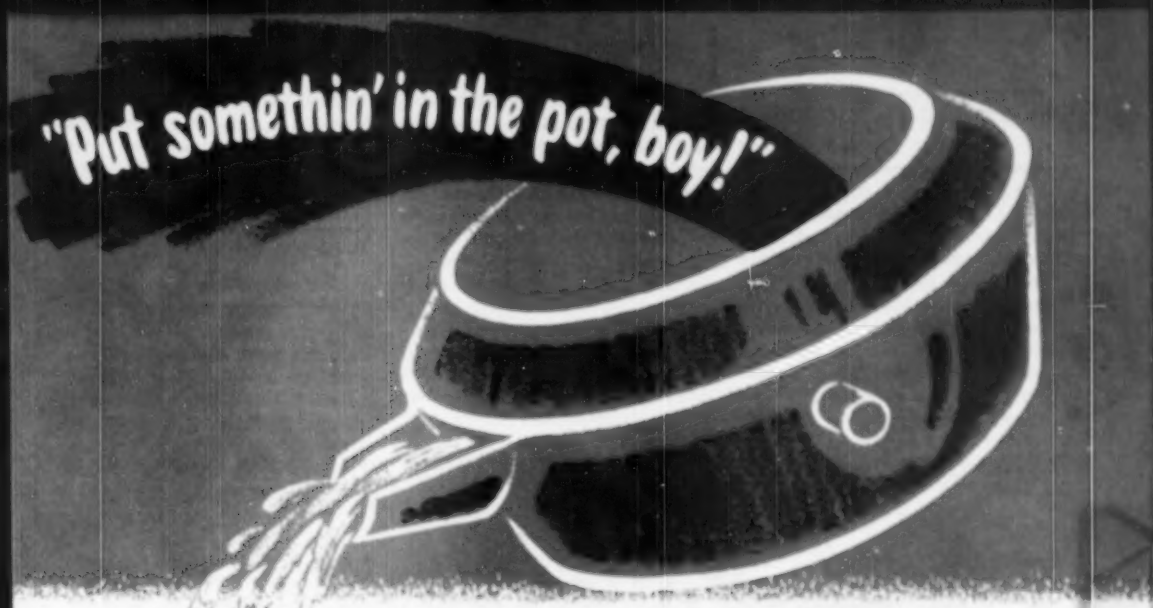
Reltool Corporation's line of shank-type dovetail cutters that offer ease in handling and time-saving in set-up work are described in Catalog No. 50 offered by the company. Illustrated are standard sizes that are available from stock.

17 BOOK LISTS SPONGE RUBBER PRODUCTS:

Sponge rubber products, including die cut and molded forms, for seals, gaskets and cushions are described in a 12-page catalog from the Sponge Rubber Products Co. The illustrated booklet lists thicknesses, sizes and colors available.

18 MACHINERY FOR METAL CLEANING:

An illustrated catalog of metal washers, degreasers, dryers and ovens is available from the Cincinnati Cleaning and Finishing Machinery Co. Data in the 24-page catalog includes a brief discussion of metal cleaning principles plus photos and descriptions of more than a score of widely varying machine types.



. . . and get NEW ANODES from YOUR NICKEL SCRAP

You can beat the nickel famine!

Dig into that nickel mine in your scrap bins. Send us those ends, swords, stubs — any nickel anode scrap. We'll cast your own metal into new oval anodes, drill and tap for hooks and ship to you pronto. You paid for this metal; why not use it? It represents a reliable source of nickel at this time and the cost of re-conversion is low. Wagner Brothers, Inc., has installed the finest melting and casting equipment available and your metal is processed under stringent metallurgical control. We're centrally located, easily reached at low transportation cost.

To handle a large volume of metal efficiently, we recommend a standard ordering and shipping procedure. Just fill out the coupon in detail and we'll send full directions for packing and shipping, and quote on any quantity.

Wagner BROTHERS INC.

We have electrolytic nickel anode scrap for re-conversion.

Stubs, average length _____ inches
Weight (less hooks) _____ pounds
Swords, average length _____ inches
Weight (less hooks) _____ pounds

Shipment can be handled in

☐ Strapped bundles ☐ By Rail
☐ Drums ☐ By Truck

NAME _____
TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

24 WAYS TO AVOID TROUBLE

(Continued from Page 24)

when processing costs are figured? First, unquestionably, is dimensional accuracy and invariance, combined with a possible complexity of form that often makes the raw die casting a virtually finished part as it comes from the die.

Of equal importance in decorative applications is the smooth as-cast finish characterizing die castings, the finely contoured and jointless surfaces that they permit and the manner in which thin and weight-saving sections can be ribbed internally to give unassailable rigidity and structural strength.

(To Be Continued in October)

ACE DRILL MOVES

Ace Drill Corporation, manufacturers of ground-from-the-solid drills and special tools has moved its plant and offices from Detroit to 2600 East Maumee Avenue, Adrian, Michigan. Their new plant more than doubles previous manufacturing area.

WITHOUT BULKINESS

(Continued from Page 51)

at a price competitive with that of concerns making similar products.

Also contributing to the manufacturer's decision to set up his own business rather than to buy the units completely assembled was the fact that, once initial die investment had been made, relatively little capital was needed to assemble and finish the product. Required are a minimum of machine tools for tapping holes and a paint spray booth and dryer to apply a metallic-colored hammer-type finish which covers surface blemishes and eliminates the need for buffing and polishing operations.

The die cast housing offers rigidity and solidity to assist in sound reproduction as opposed to the tinny sound of vibrating stampings.

Strength and durability are also contributed by the housing. Dropping speakers on the ground or allowing them to strike against the metal post on which the sets are mounted are only two of the abuses which the speakers must and do absorb when die castings are used. The impact resistance of die cast metals is superior to that of light gauge stampings.

The hammer-type finish on the speaker housing and junction box give the unit weather-resistance and an attractive appearance. After vapor degreasing, a primer coat of Palladin is applied to the unit, both inside and out. The castings are then sprayed on the outside with the metallic-colored finish and dried.

Featured in the speaker sets is a tamper-proof volume control knob. The knob mounts from the inside, eliminating a screw-type adjustment which might be tampered with by inquisitive movie-goers.

DURING WORLD WAR II
UDICO MADE
Millions of Precision "ZAMAK" Alloy Incendiary Bomb Parts
WITH THE LOWEST REJECTION
Record in the Nation!
WE DID IT BEFORE—WE CAN DO IT AGAIN

Inquiry is invited. As the largest exclusive manufacturers of "Zamak" castings in the west we are in position to give you good prices and prompt service on requirements for Industrial, Plumbing, Petroleum, etc.

UNION DIE CASTING CO., Ltd.
2313 East 51st St. Los Angeles 58, Cal.
MEMBER OF AMERICAN DIE CASTING INSTITUTE

The junction box has an accident elimination feature in a post light which illuminates the concrete base and metal tube on which the unit is mounted and area around the base without interfering with one's view of the movie screen. An illuminated window which shows car locations is also found in the junction box.

The speaker housing itself consists of two pieces, the cover half and the back half.

The cover half of the speaker housing is an attractive looking casting with its clean, sharp detail reproduced by die castings. It has a beading which covers the joint formed when the two halves are assembled and adds to the strength and appearance of the assembly, and a grating which allows sound to exit, but has a finely perforated stamped aluminum grille resting inside it to prevent anything even as small as a hatpin from being inserted and puncturing the cone. The handle at the top and the pinched grip at the bottom are cast-in parts of the speaker housing.

The lower part of the cover half is recessed to form a protective area around the volume control knob which is mounted from the inside through a cored hole. Internally the cover half has four cored holes that are tapped for fastening to the back half and cast-in bosses for mounting the speaker.

The back half of the speaker housing has a cast dove-tailed slot in which the die cast speaker hanger is inserted. It also has cored slots which are cast to close tolerances, allowing the volume air generated by the six-

Figure 3. The attractive speaker with a metallic-colored organic finish is shown above hanging on an old-style mount.

inch speaker to escape without interfering with tone production. Four holes in the back half with cast counterbores are used for receiving the machine screws which screw into the threaded holes in the cover half and join the two halves.

The junction box is a two-piece unit of zinc die castings. It is also finished in the hammer-type finish and has the post-light and illuminated window already mentioned. The upper half of the junction box has cored recesses in which the speakers are placed when not in use. The lower half of the box is mounted on the metal post.

...HERE AT

ADVANCE PRESSURE

WE HAVE

THE IMAGINATION TO DESIGN

THE SKILL TO DEVELOP

AND THE FACILITIES TO PRODUCE

ZINC and ALUMINUM die castings

which not only lower manufacturing costs but improve the eye appeal, function and salability of the product.

We invite you to feel free to consult our engineering staff. Let's get acquainted.

ADVANCE PRESSURE CASTINGS, INC.

20-30 WYTHE AVE. • BROOKLYN 11, NEW YORK

INDUSTRY NEWS

MESLANG TAKES NEW CRUCIBLE POST

Appointment of David R. Meslang as manager of the Seattle branch of the Crucible Steel Company of America, was announced recently by W. H. Wiewel, vice president in charge of sales. Mr. Meslang has been associated with Crucible since 1935, when he joined the San Francisco branch.

In 1940 he was assigned to the Crucible metallurgical laboratory at Syracuse, New York. He returned to the Pacific Coast to become office manager of the Seattle branch, remaining in that capacity until inducted into the Army in 1945.

Returning to Crucible in October, 1946, Mr. Meslang became a salesman with the San Francisco branch.

SIXT PROMOTED AT MICHIGAN ABRASIVE

N. C. Sixt of Niagara Falls, New York, has been named technical assistant to Fred P. Hauck, vice-president of the Michigan Abrasive Co., it was announced recently by Max C. Jones, president. Mr. Sixt is a former Carborundum process engineer and was general manager of the Susquehanna Chemical Corp.

A member of the American Chemical Society, Mr. Sixt also belongs to the American Institute of Chemical Engineers, the Technical Association of the Pulp and Paper Industry and the American Association of Textile Colorists and Chemists.

HY-PRO TOOL MOVES INTO NEW PLANT

Hy-Pro Tool Co. of New Bedford, Massachusetts, manufacturers of taps, slotting saws and allied metal cutting tools, is now completely established in its new plant where full production capacity has been reached.

The new plant is double the size of the company's former quarters, contains facilities for maintaining high production and provides modern facilities for minimizing worker fatigue and increasing efficiency.

UPHAM RETIRES AT ATLAS POWDER

J. E. Upham, eastern New England representative of the Atlas Powder Company's Industrial Finishes Department for the past 25 years, retired recently, completing a sales career that started in 1907. Mr. Upham's territory will be taken over by George M. DeCamp of Winchester, Mass., and Everett H. Jenks of Providence, R. I., both of the company's New England sales force.

LESTER ENGINEERING HEAD DIES IN CLEVELAND AT 66

Nathan Lester, president of the Lester Engineering Co. and Lester-Phoenix, Inc., died of a heart attack recently at his home in Cleveland, Ohio. His death, at the age of 66, brought to an end a lifetime devoted to the die casting process. Mr. Lester was widely known in the field, his associations going back more than 40 years.

Mr. Lester was an energetic promoter and a pioneer in many phases of die casting techniques, particularly high pressure casting of aluminum with the cold chamber.

He was the holder of many patents in the field of die casting, and in the course of his career he was associated with many of the largest die casting companies operating today, including Doehler-Jarvis Corporation, Precision Castings, General Electric, Westinghouse, and General Motors. In 1935 he organized the Lester Engineering Company and subsequently Lester-Phoenix, Incorporated.

Mr. Lester was survived by his sons, William M., who is president of Pyro Plastics Corporation and Thomas J., president of Lester Castings, Inc.

GORDON NEW PRESIDENT OF SCHULTZ OF CANADA

A. St. Clair Gordon recently purchased controlling interest in Schultz Die Casting Co. of Canada, Ltd., Wallaceburg, Ontario, it was announced. The company supplies die castings to American companies and their affiliates in Canada.

Besides Mr. Gordon, who is president of the firm, new officers and directors include R. A. Lueditke, chairman of the board; R. A. Gordon, vice-president; G. F. Clark, secretary-treasurer; P. G. Jefferies, general sales manager; G. D. Fry, chief engineer; and James Gerity, W. J. McLelland and H. V. Peterson.

RACINE DIE CASTINGS MOVES

As a part of its expansion program, Racine Die Casting Co. has moved from its old location to a new location at 1500 16th Street, Racine, Wisconsin. The new plant has a working space

of 35,000 square feet and offers ample storage room and more processing space for secondary operations on die castings.

The entire structure is sprinklerized and has a large fire proof die vault. Equipment has been added to the tool room to keep tooling cost to a minimum. The plant is all on one floor, but a second floor, as yet unused, will be eventually used for a laboratory and to house the engineering department.

ALLEGHENY LUDLUM SETS SALES RECORD

Reflecting the strong demand for its products and increased and more economical production from improved and expanded facilities, Allegheny Ludlum Steel Corporation during the first six months of 1950 established record sales and net earnings while giving employment to the greatest number of workers in its entire history.

H. G. Batcheller, chairman, reported to the board of directors that first half sales totaled $78,288,590 and resulted in net earnings of $4,571,171, equivalent to $3.36 per share of common stock after provision for preferred stock dividends.

Faster, more economical production made possible by the company's recently completed $30,000,000 plant improvement was the key to the records, according to Mr. Batcheller.

SLAG FUMING PLANTS CONSERVE ZINC, LEAD

While the demand for non-ferrous metals far exceeds the country's supply and the present military situation highlights the need to conserve all available material, significant beginnings have been made toward the recovery of vast quantities of zinc, lead and other critical metals through a process known in the smelting industry as "slag fuming."

Slag fuming is a highly efficient process for recovering metals from slag dump residue which had been discarded after ordinary smelting operations as being economically useless. During and since the last war, three installations of slag fuming equipment have been made in North America, according to D. V. Sherban, engineer of The Babcock & Wilcox Company, which has worked closely with the smelting industry in developing and manufacturing the equipment for this process.

The first installation of B&W designed fuming equipment was made in the Kellogg, Idaho, plant of The Bunker Hill and Sullivan Mining Company in 1943, according to Sherban. This operation recovers 40 to 45 tons of zinc, in addition to a smaller amount of lead from approximately 400 tons of slag daily. The second installation of this equipment was made at the El Paso, Texas, plant of The American Smelting and Refining Company which went into service two years ago.

The latest installation, which Sherban supervised and which is just now being erected was made

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at Flin Flon, Manitoba, 600 miles above Winnipeg in the Canadian Northwest and near the Arctic Circle, for the Hudson Bay Mining and Smelting Company. At this smelter there is an 800,000-ton accumulation of residue containing about 26 per cent zinc alone, it is estimated.

Sherban describes the fuming operation as a process in which zinc or lead, in the form of vapor or fumes, is boiled or "fumed" up from the surface of a furnace-load of molten slag. The vapor is converted into a metallic oxide which is cooled and collected as a solid mass, or as a powder known as "fume" for further processing into finished metal.

DUPONT APPOINTS TECHNICAL DIRECTOR

Dr. Max T. Goebel, assistant technical director of the DuPont Company's Grasselli Chemicals Department, has been appointed technical director, succeeding Dr. John C. Woodhouse who has undertaken a special assignment with the company.

ATLAS MINERAL PROMOTES SICKMAN

Edison C. Sickman, formerly Baltimore district sales manager, has been appointed general sales coordinator of the Atlas Mineral Products Co., Mertztown, Pennsylvania, according to George L. Wirtz, president. Mr. Sickman received his degree at the University of Dayton and has done work at Wittenberg College, Indiana University and Antioch College. Prior to joining Atlas he worked in various phases of management and sales in the plating supplies and metal finishing fields.

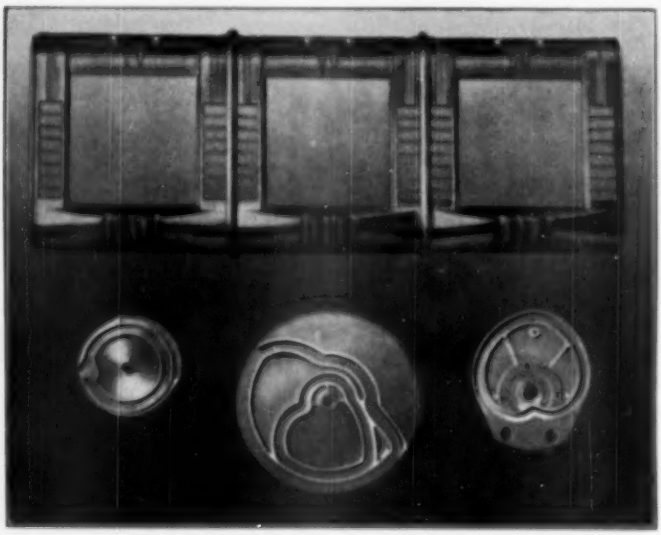
Also announced was the appointment of Ray Russell Graver, a recent graduate of Muhlenberg College, to the engineering department and the appointment of Gerald F. Gilbert, Jr., a recent graduate of Lehigh University, as assistant to the technical director.

PLATING SCHOOL OFFERS CORRESPONDENCE COURSE

The Joseph B. Kushner Electroplating School is accepting enrollments in its newly revised correspondence course in modern electroplating practice, according to Joseph B. Kushner, consulting electroplating engineer. Called, "Electroplating Know How", the course is given to help platers, plating executives and chemists keep abreast of latest developments.

HOUGHTON ELECTS TWO

E. F. Houghton & Co., industrial oils and leathers manufacturer, announces the election of two new members to the Board of Directors at a meeting held recently at the company's main office in Philadelphia, Pa. The newly named members are D. C. Minor, advertising manager, and William K. Barclay, Jr., Philadelphia resident partner of Stein Bros. & Boyce, members of the New York Stock Exchange.



PRODUCTION SAMPLES ON THIS JOB WERE DELIVERED 7 WEEKS AFTER RECEIPT OF ORDER

Zinc die castings for a famous make record player illustrated above. The large casting at the top is approximately 12" by 30" weighing about ten pounds.

Cam tracks on lower castings were cast without draft and were held within .002. All parts were furnished ready for assembly.

Inquiries Invited

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CURRENT REVIEWS

Book reviews, abstracts of current articles and descriptions of products and processes of special interest to the designers, purchasers and finishers of die castings are included in this department.

HANDBOOK ON DESIGNING FOR QUANTITY PRODUCTION

HERBERT CHASE

McGraw-Hill, New York, Revised 2nd Edition, 564 pages, $7.50

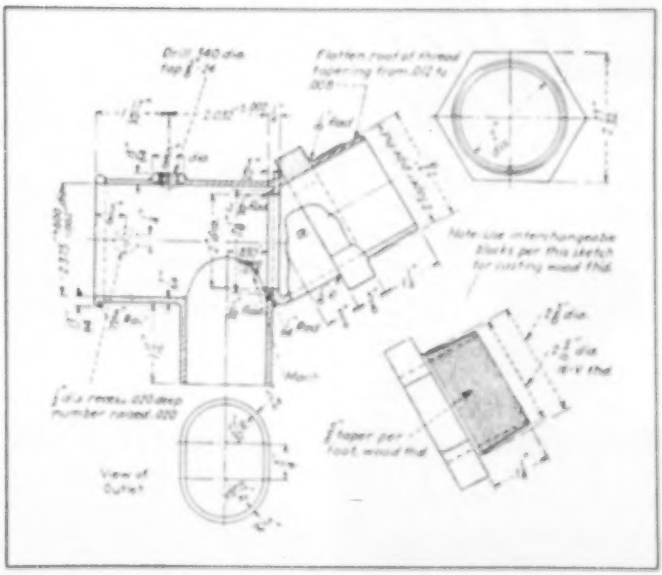
Tested rules to follow in designing parts for quick and economical mass production are given the reader, along with complete explanations of high production processes and pointers on designing for each.

Part I, which covers important types of metal production processes, including die castings, sand and permanent mold castings, stampings and forgings, has been expanded to include wire forms, impact extrusions, and sintered powder compacts.

Types of metal products are compared with one another in Part II and specific reasons are given as to why one type is chosen over another in actual industrial applications. Besides comparing die castings with sand and permanent mold castings, stampings and screw-machine products, new sections compare sintered powdered compacts with other high production processes and malleable iron castings with equal stampings and forgings.

The book is amply illustrated with photographs, drawings and tabulated charts. One of the drawings, which illustrates proper dimensioning of a die castings drawing, as pictured left, below.

Proper dimensioning of die casting drawings is shown in the illustration, below, included in the 2nd Edition of *Handbook on Designing for Quantity Production* by Herbert Chase published by McGraw-Hill.



PAPERS ON FINISHING OF METAL PRODUCTS

The following three abstracts are condensations of papers presented at the 37th Annual Convention of the American Electroplaters' Society held in Boston, June, 1950.

MEASURING THE ADHESION OF ELECTRODEPOSITED COATINGS

Brenner and Morgan, National Bureau of Standards, Washington, D. C.

Described is a new test for the adhesion of electrodeposits that involves the electroforming upon the surface of the coating of an adherent, small, mushroomed-shaped nodule of cobalt which serves as a grip for applying the detaching force. A nodule 1/16 inch in diameter at its base is formed by means of a plastic mask, and detailed directions are given for the procedure necessary for the production of a satisfactory nodule. The construction and use of a special spring balance for the

measurement of the force required to detach the nodule are described.

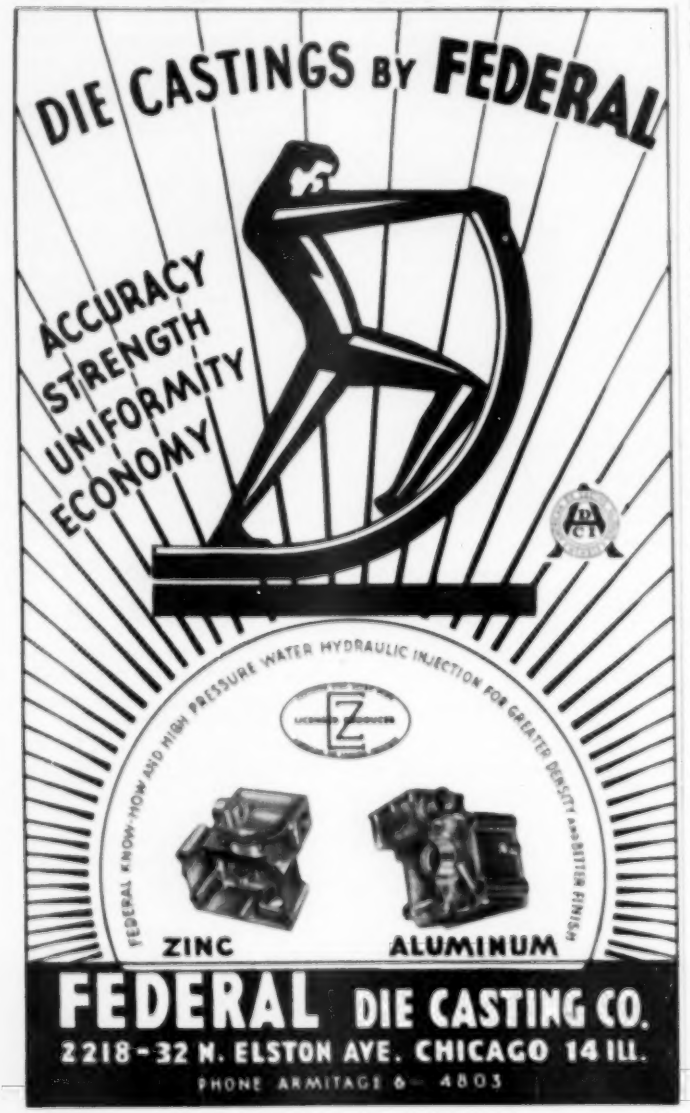
The method is advantageous in that no specially-shaped test pieces are required, no machining operations or expensive physical testing machines are involved, and the results are expressable in ordinary engineering units. The disadvantages are that the results are only approximate and the test must be performed in a laboratory by a skilled technician. The time is 8 hours, but a skilled operator can run 10 tests per day.

WATER-BASE BUFFING LIQUID

Candee and Daughtry, Lea Manufacturing Co.

The increased use of automatic buffing machines has made it necessary to develop bars of buffing compounds which lend themselves to use in automatic bar applicators. The mechanical problems encountered in making bars for this purpose center about the strength, impact resistance, melting point, tack and size of the nubbins. The authors discuss liquid buffing compositions applied to wheels with a spray and explain how these compounds avoid many of the problems connected with bar applicators in automatic machines.

How different variables enter in the overall picture of liquid buffing compositions is discussed at some length. These variables include melting point of the binder, binder-to-grain ratio, wheel characteristics, temperature of buff, gun operation and wheel adherence.



METAL FINISHING BY ABRASIVE TUMBLING

Hubert M. Goldman, Eothone, Inc.

This detailed discussion of abrasive tumbling and related operations deals with the theoretical and practical aspects of the subject. Emphasis is placed on techniques where actual cutting-down of metallic surfaces is desired, and burnishing practices are not treated unless they automatically accompany the truly abrasive operations.

After an historical introduction, the purposes and advantages of tumbling are considered in detail. The principles and mechanics of the operation are dealt with at great length and theoretical interpretations of the behavior of the contents of the tumbling barrel are presented in a critical manner. Relationships between work-load, media and barrel volume are considered along with barrel speed.

Descriptions of varying length and detail for many illustrative tumbling operations include tumble finishing of die cast toy pistols of zinc, deburring of 55-pound bronze castings and preparation of bicycle hubs for bright nickel and chromium plating.

WELDING DRAWN SHELLS TO ALUMINUM DIE CASTINGS

Iron Age, Vol. 165, No. 26, June 29, 1950, page 82.

How drawn aluminum spinner shells used in Easy portable washing machines were spot

welded to an aluminum die cast spinner bottom in assembling to replace the previously used spinning operation is explained.

Speedier and more satisfactory results are obtained. Six spot welds per piece are made and about 250 pieces are welded per eight hour day. Welding equipment used is described.

OUTBOARD COSTS DON'T GO OVERBOARD

CHESTER S. RICKER

American Machinist, Vol. 94, No. 15, July 24, 1950, pages 93-95.

How Chris-Craft's new Challenger engine was redesigned to fit in with fast, economical production in the shop after operating characteristics had been engineered into the original design is explained. Material and methods selection that included die castings, permanent mold and sand castings of aluminum resulted in a better performing engine produced with a simplified production sequence.

Among die castings used in the engine are an unmachined cover for the water pump, connecting rods of aluminum with cast-in bronze crank-pin and piston-pin bushings, a two piece gas tank that is sealed with vulcanized, gasoline-resistant neoprene and locked by self-tapping screws and a detachable head which has a cast water passage close to plugs to keep them cool.

PRECISION ALUMINUM CASTINGS

HIRAM BROWN

American Foundryman, Vol. XVIII, No. 1, July, 1950, pp. 50-57.

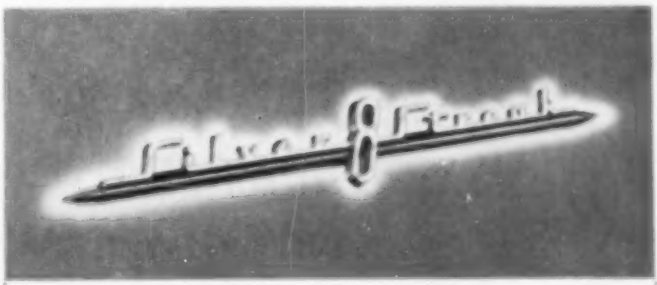
Five different processes by which precision aluminum castings can be made are discussed by the author. These include die casting, sand, permanent mold, plaster and investment casting. Also treated is centrifugal casting which the author says can be applied to almost all of the processes named.

In discussing the factors which affect quality of castings made by the various processes, the author first discusses recommended practices for obtaining high quality metal and touches upon the original purity of the metal, fluxing and degassing, controlling temperatures and various metal flow factors. He then treats each of the various molding processes individually and ends with a final summary showing tolerances, machine allowances and finishes that can be expected of each.

Accompanying the article are pictures of die castings, plaster mold and investment castings, as well as three tables, including a comparison of as-cast physical properties of die castings and permanent mold castings of similar aluminum alloys.

ELECTROPLATER GANN DEAD AT 58

Edward Leo Gann of the Hanson - Van Winkle - Munning Co., Matawan, New Jersey,



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passed away recently at the age of 58. Mr. Gann was an outstanding practical electroplating expert and known for his work as an electroplating trouble-shooter.

Mr. Gann started at Hanson and Van Winkle in Newark, New Jersey, in 1908 and remained with the firm when it consolidated with the A. P. Munning Co. in 1927. While with the firm, he worked in the plating barrel, anode and experimental departments, before taking up his job of servicing plants all over the United States.

ASME MEETING FEATURES 24 TECHNICAL SESSIONS

The American Society of Mechanical Engineers will hold its Fall Meeting in Worcester, Mass., September 19 through 21. Some 50 papers in such fields as heat transfer, management, metals engineering, production engineering, machine design, safety, hydraulics and gas turbine power will be delivered at 24 technical sessions.

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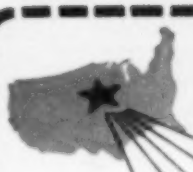
WESTINGHOUSE ELECTRIC DECLARES DIVIDEND

The Board of Directors of the Westinghouse Electric Corp. recently declared a dividend of 95 cents a share on the 3.80 per cent Series B preferred stock and 40 cents on the common stock. The dividends are payable September 1 to stockholders of record August 9.

OPTIMUS APPOINTS NEW JERSEY REPRESENTATIVES

Optimus Detergents Co. of Matawan, New Jersey, recently announced the appointment of Charles N. Chalfant as its industrial service representative in the metropolitan New Jersey area.

Mr. Chalfant brings to Optimus four years of experience with the Wyandotte Chemical Co. in sales and service engineering among industrial users in southwestern Ohio. Prior to that, he was Detroit service representative of G. Whitfield Richards, manufacturer of cutting, drawing and grinding lubricants. His previous industrial experience had been as a member of the chemical and metallurgical laboratory staff of the Copperweld Steel Co.



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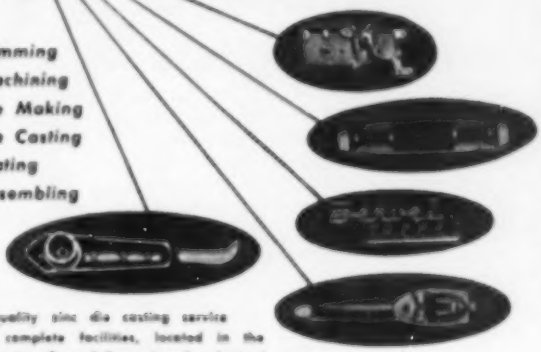

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TEMPIL APPOINTS TESMEN

Tempil Corp. recently announced the appointment of Arthur B. Tesmen as Sales Engineer. Before joining Tempil, Mr. Tesmen was with North American Philips Co., Inc., in charge of sales-service, promotion and development of their electrodes and other welding products. Prior to that he was with Crucible Steel Co. of America as metallurgical engineer.

ASM LISTS EXHIBITS TO BE FEATURED AT METAL SHOW

A total of 350 exhibits will display the latest developments in all branches of metallurgical and metal working fields at the 32nd National Metal Congress and Exposition to be held at the International Amphitheatre in Chicago, October 23-27. The American Society for Metals, the

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American Institute of Mining and Metallurgical Engineers, American Welding Society and the Society for Non-Destructive Testings will each hold technical sessions concurrent with the Exposition.

In addition to technical sessions by the sponsoring societies, the American Society for Metals will conduct educational lectures, including a seminar on "Atom Movements," a business forum and two sales clinics.

Other features of the Exposition include the fifth metallographic exhibit of the ASM in which exhibits under a dozen classifications will show micrographs in photographic halftones and as transparencies, and motion pictures depicting procedures for lower unit costs and high production.

SUPERIOR ELECTRIC

(Continued from Page 12)

is able to withstand impact or stresses encountered when assembly screws are tightened.

From an appearance standpoint, the die cast housing offers excellent detail and smooth surfaces. A durable, black wrinkle paint is applied and baked. The lettering is produced on the die casting in high relief, and after the housing is painted, the tops of the letters are milled off bright for maximum legibility.

These three castings are typical of the uses for die cast parts in the electrical industry and represent the major applications which may be summarized as: 1) housings, 2) structural parts and 3) special purpose elements to transmit electricity, dissipate heat or other functions.

FINISHING MAGNESIUM

(Continued from Page 44)

provide a durable black coating for cast and wrought magnesium parts. The treatment provides a deep black finish with good light absorbing

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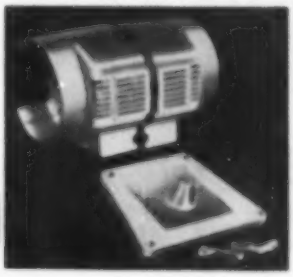

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characteristics suitable for use on optical instruments, and substantially improves the resistance of surfaces to corrosion. The process is reported to be somewhat superior to the Dichromate Treatment in hardness of coating formed. The chemical treatment also provides a useful paint base. Castings containing bearings, studs, or non-magnesium inserts of any nature may sometimes require this treatment, particularly when parts need refinishing. Brass, bronze, steel, and cadmium plate are reported to be unaffected by the treatment. Aluminum is rapidly attacked during the hydrofluoric acid treatment step.

The black finish is obtained by a series of three treating steps. The first step serves to remove oxide and brighten the surface of the metal. It utilizes a "bright pickle" solution. If a dull black with maximum light absorbing qualities is desired, a very light blasting should be substituted for the "bright pickle." The "bright pickle" may sometimes be inadequate to remove swirls or other surface imperfections in die castings in which case it is recommended that mechanical buffing or wire brushing be substituted for the "bright pickle." After any of these mechanical methods are used, the part is then ready for step number II, which consists of a hydrofluoric acid pickle. Magnesium parts must have surfaces free from oil and grease prior to application of the chemical treatment. The "bright pickle" still requires that magnesium die castings be immersed for 30 seconds to 2 minutes in a solution of the following composition operated at room temperature:

Chromic acid (CrO_3)	37½ oz./gal.
Nitric acid (Conc. HNO_3 Sp.Gr. 1.42)	3¼ fl. oz./gal.
Hydrofluoric acid (48-52% HF)	1 fl. oz./gal.

Following the treatment parts are rinsed immediately in a cold water both containing 5% sodium metasilicate (6½ oz./gal.) and further rinsed in cold and hot water.

After the "bright pickle" treatment, parts are given the "HF pickle" treatment by immersing for 5 minutes in a solution containing 15 to 20% by weight of hydrofluoric acid (HF) at room temperature. A satisfactory bath can be prepared by diluting one volume of technical grade 48-52%

hydrofluoric acid with two volumes of water. Following this, parts are washed thoroughly in cold running water. In handling hydrofluoric acid great care must be taken to avoid contact with the skin.

After the above treatments, a uniform black coating is obtained on the parts by treating for 30 to 40 minutes in the following solution maintained at the boiling point (210-212°F.):

Ammonium sulfate $(NH_4)_2SO_4$ ..... 4 oz./gal.
Sodium dichromate $(Na_2Cr_2O_7.2H_2O)$ ... 4 oz./gal.
Ammonium hydroxide (NH_4OH-Sp. Gr. 0.880) ½ fl.oz./gal.
Nigrosine black W. S. dye (color index No. 861) or
Indulin bluish W. S. (color index No. 861) ..... ¼ oz./gal.
pH 5.6 - 6.0

Properly applied coatings will be a solid black. Methods for control of the various solutions used have been worked out by the Dow Chemical Company.

(To Be Continued in October)

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The Razor die castings involved design of product, construction of dies and tools, casting, plating, packaging and finally shipping.

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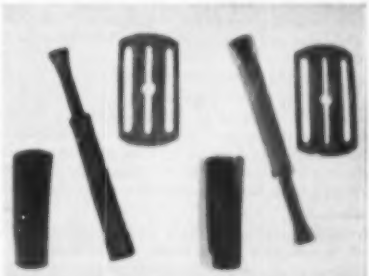

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ALMAG is tough, has high tensile strength—is not brittle. It is designed to do the job where toughness, durability and economy is required.

In addition, **ALMAG** is more corrosion resistant than other alloys usually used for die casting. This factor makes it highly desirable for the manufacture of lightweight marine fittings.

Die casting with these new light metal alloys offers to manufacturers greater opportunities to lower production costs and the weight of their products. Also, these metals allow more freedom of design and offer greater scope in carrying out the designers' ideas. In addition, these die castings save many man-hours of finishing time.

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PLANT AND EXECUTIVE OFFICES

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